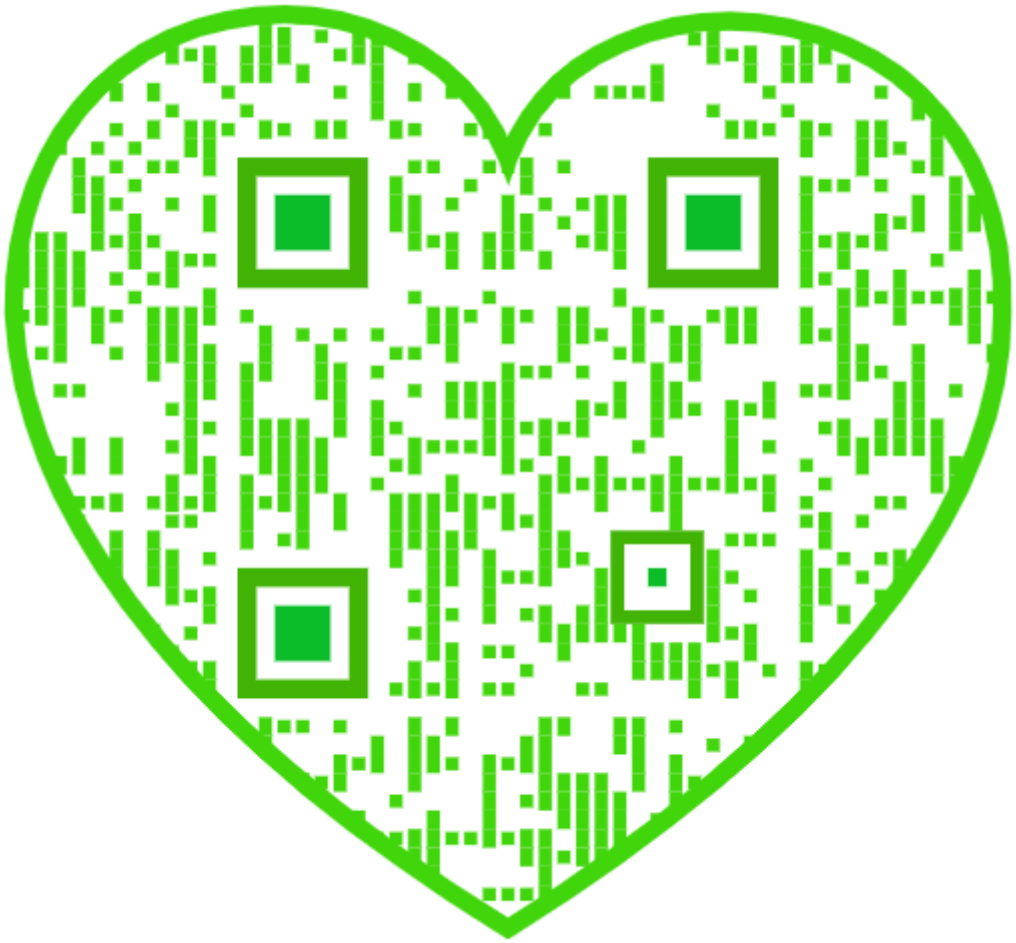

PATTERN MAKING

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PATTERN MAKING

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UNIV. OF
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C. E. P.

PREFACE

A system of drafting is merely a method or plan for drawing patterns. The purpose of this book is to present the problems involved in pattern making so that the teacher of sewing may be independent of the limitations of any individual system. The making of patterns by drafting is a very simple process if the principles that underlie the shape of patterns are clearly understood, and knowledge of these should lead to greater freedom in the making and the use of patterns for clothing of unusual design.

This book is planned, primarily, as a textbook for college or normal school students and for teachers in service. In making a specialized text for only one of the several types of work included in that composite unit —a clothing course, the author has been actuated by two motives. One of these is the hope that such a book might help sewing teachers to see the need of making pattern study a definite part of their sewing courses rather than a mere detail of making garments. The second is the conviction that the use of a comprehensive textbook for each of the main topics of the course will assist in strengthening the quality of the work done in normal school and college clothing courses.

A. K. H.

March, 1922.

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PATTERN MAKING

UNIV. OF CALIFORNIA

PATTERN MAKING

INTRODUCTION

PATTERN STUDY IN THE SCHOOLS

SOME study of patterns is included in all clothing courses that are concerned with the making of garments. The type of work that is given and the purpose of such study vary greatly in the different grades or with the emphasis that is given to this problem by different teachers. Every girl who undertakes to plan, cut, and fit clothing for herself or for any one else should know something about the shape of each of the pieces of the pattern that she uses, and understand what effect a modification or change of any line in a pattern will have on the cut or shape of the garment. Such knowledge not only makes her more intelligent in the selection and in the use of patterns, but, if this study of patterns has been comprehensive enough, it should give her power to adapt patterns to the needs of an individual figure and to change the lines of a pattern in order to produce some special effect.

Pattern making.—A more specialized function of pattern study is to give students power to make patterns, a more difficult problem than to adapt or change commercial patterns. Patterns can be made by drafting, free-

hand cutting, and modeling, each method being particularly adapted to the making of certain types of patterns. Basic patterns, such as plain waist, sleeve, and skirt patterns, the outlines or proportions of which are conditioned by the shape of the figure, are usually drafted or drawn on paper or cloth, while patterns for garments of unusual designs are generally modeled. The making of unusual or original patterns by drafting is undertaken only by experienced designers, for it is extremely difficult to project upon a flat surface the effect which is to be produced on a rounded figure, when the outline of the pattern varies greatly from that of basic patterns. It is much simpler to make such patterns by modeling, which is the adjustment or fitting on the figure of a fabric or soft paper to secure the effect which is desired. This is primarily a fitting problem. Patterns for pockets, trimmings, collars or other decorative details are usually cut freehand, the desired outline being perfected by fitting rather than by drawing.

The extent to which the home dressmaker needs the ability to make patterns depends upon the type of sewing that she undertakes. Basic patterns of good cut to suit people of every size can be purchased in the shops. It is seldom possible, however, to purchase commercial patterns for waists, gowns, or wraps of unusual design, and the home dressmaker who undertakes to make these garments must make her own patterns. This would seem to indicate that some experience in modeling, which is the method used to make such patterns, should be given in all advanced dressmaking courses. The value or the necessity of teaching drafting does not, however, seem to be justified on these grounds since it is possible to secure satisfactory basic

patterns without making them. Furthermore, these patterns can be used with only minor modifications through several years, which means that the highly specialized technique of drafting patterns will be so seldom used in the home sewing that few girls will remember the details of drawing well enough to make patterns by this method.

The real value of drafting in school work has been much confused by this emphasis on the practical value of ability to make patterns. While agreeing that it may be possible to purchase excellent commercial patterns for average figures, many teachers advocate the teaching of drafting because it will enable a girl to make patterns for unusual figures. Unless the drafting system that is taught uses actual measures for both the position and length of all the lines of the pattern, drafted patterns will be as conventional in outline as commercial patterns. An examination of the drafting systems used in schools will show that in many of them the drawings are based on average rather than actual measures for many parts of the pattern which results in the class making standard rather than individualized patterns.

Drafting as a method of studying patterns.—It is evident that the use of drafting in school work must be based on its value as a method of studying patterns rather than on its practical value in pattern making. Although it is possible to study the shape and the characteristics of patterns by analyzing and comparing different commercial patterns, the closer attention and greater interest which will be given by a student when she is actually making a pattern has resulted in the use of drafting as the best method of studying patterns. Drafting should give to a class knowledge of the shape of the parts of patterns and of the changes in shape that are

necessary to produce certain different effects, or to adapt the pattern to a particular figure; it should give power to select, modify and alter commercial patterns. This means that drafting must be taught in such a way that the principles underlying the shape of the pattern and the causes of variations in the shape of different patterns must be emphasized rather than the method of making the drawing.

Unfortunately, a great deal of the drafting taught in schools emphasizes methods of making the drawing and students are given no explanation of the reasons for using a particular measure or for drawing the lines of a pattern a particular way. This is the result of misunderstanding the function of drafting and of the use of inadequate drafting systems. The explanation of the reasons for drawing the lines of a pattern in a certain way is not simple: it means that a class must be taught to see the connection between lines placed in a certain position on a curved figure and these same lines transposed on a flat surface; it means demonstration of how and why extra fullness or more curve can be added to some parts of a pattern and not to others and of the effects that will be produced by the slightest modification in the position of seams. This is a difficult teaching problem, and in order to reduce the number of these explanations and to minimize the possibility of errors in drawing, most drafting systems have been made as mechanical as possible. As a result, the main objective in teaching drafting is defeated and instruction centers around the technical problem of making a drawing.

Even with a most adequate system of drafting and with a method of presentation which emphasizes the explanation of the shape of the pattern, some time must always

be spent in a drafting class in explaining the technique of making the drawings. Construction lines, which are used as the framework on which the pattern is made, are an essential part of the making of a drawing, but knowledge of the number and position of these lines would seem to be of little assistance in the explanation of why the arm curve is a particular shape, or how it must be changed for different figures. It is because the making of the drawing gives a motive for a detailed study of the pattern, and furthers more exact observations of small variations in shape that practical drafting problems are used to vitalize the study of patterns, in spite of the fact that the technique of drawing must be taught.

Though few of the members of a sewing class may ever draft patterns for their home dressmaking, the drafting that they have done in school should contribute to their ability to make patterns by freehand cutting and by modeling. The details of how to make a pattern may be soon forgotten but the structural lines of a pattern are so emphasized in a drawing that experience in drafting should give a clearer idea of how to plan the cutting of a trial pattern which is to be modeled or fitted to the figure. Many of the one piece sleeves are so simple in line that a student of drafting should be able to cut freehand patterns because of her knowledge of the shape of sleeves of different types.

The selection of a drafting system.—Drafting systems are many and varied, and they illustrate different degrees of excellence. The following general principles should be considered in the selection of a system for school work, if the greatest educational value is to be secured from drafting:—

1. The measures that are used for the drawing should be actual not proportional measures. The use of a proportion of the neck measure to place the height of the shoulder is inexplainable, and the use of a proportion of the bust measure for the chest measure is illogical unless every one possesses an average or standard figure.
2. Mechanical devices should not be used. They reduce flexibility in making variations in the drawings for different types of figures, and they, also, make it possible for a student to make a drawing with the minimum amount of thinking and attention.
3. The plan of the draft should be understandable, and it should be possible to demonstrate this plan by drawing on a bust form, so that the significance of each construction line or the use of each measure is clearly understood.
4. The draft should allow for variations in the drawing of each line so that it will be possible to reproduce the differences in size and shape of different figures. A person who is to make a pattern must not only be able to make a drawing according to a prescribed plan, but she must, also, be able to analyze the figure of the person for whom the pattern is to be made and adapt the drawing to these conditions.
5. The system should make equally satisfactory patterns for all types of figures. Some systems make better waist patterns for small bust sizes than for large bust sizes, and others do not make equally satisfactory patterns for full and scant skirts.

Methods of presenting drafting.—Even after a good drafting system has been selected, the method of presentation which the teacher uses is another vital factor in the effectiveness of a drafting course. One of the very common practices in teaching drafting is the use of a dictation method. The directions for drawing the pattern are dictated to the class by the teacher who at the same time makes a similar drawing on the blackboard. These dictated directions for making the drawing may follow some general discussion of the shape of the pattern and the method by which the drawing secures this shape, but this preliminary demonstration is not always used. One of the reasons for this formal method of presentation has been the character of the directions for making drafts that are given in most manuals and textbooks. Such directions almost invariably use numbers or letters to designate the lines of the pattern or the points from which the lines are drawn. Though this greatly simplifies the writing of directions for making the patterns, it results in making the method of drawing quite mechanical because the attention of the class is centered on the position of these mechanical aids, rather than upon the character of the lines which they are drawing. If a drafting system is based on logical principles it should be possible to eliminate the use of letters and numbers from the directions for making the draft.

Drafting taught by demonstration and discussion.—The act of drawing a pattern should come as a final problem in the study of a draft; it should be used as a test of the students' understanding of the shape of the pattern and the basis on which the pattern is drawn. The study of the shape of a pattern, which should precede the actual drafting, should include an analysis of the

shape of commercial patterns of different makes and of the characteristic differences in shape which will be caused by certain types of figures. Patterns that have been modeled on different people will show these characteristic differences quite clearly or the same points can be shown by fitting a standard pattern on several members of the class who illustrate differences in proportions or shape.

This analysis of the shape of patterns should be followed by a demonstration of the method by which the shape of the pattern can be secured by a drawing. In demonstrating the plan of a draft, the position of all construction lines should be drawn on a bust form, and illustrated on some member of the class in order to show clearly the relation of construction lines and the actual lines of the pattern. If the reasons for the drawing of every line of the pattern are explained clearly and each point graphically demonstrated, the actual drawing of the pattern becomes not a mechanical following of directions but a problem of reproducing on paper the points which have been demonstrated on the figure. If this demonstration has been well given, most of the directions for placing the main lines in a blackboard draft can be given to the teacher by the class. This not only gives the class experience in projecting upon a flat surface lines drawn on a curved figure, but it also gives them an opportunity to think out the method of drawing the pattern without having their attention distracted by having to make the drawing at the same time. This class discussion should be followed by individual experience in drawing the pattern.

Amount of pattern making in courses.—The amount of pattern making which should be included in a study

of patterns will depend upon whether the objective of this work is ability to select and use patterns, or power to make patterns. When the emphasis in pattern study is on the selection and the modification of patterns, the standard waist, sleeve, and skirt patterns may be the only drawings made by the class, and the main laboratory work may be the alteration of commercial or stock size patterns to meet the needs of different types of figures or special effects. If ability to make patterns is one of the aims of drafting, the class should not only make drawings for patterns of standard sizes but each member of the class should also have experience in making individualized patterns for different types of figures, and, in addition, original drafts should be required throughout the course. Though only an experienced designer should attempt to make very unusual patterns by drafting, there are many special designs for underwear, waists or sleeves, the patterns for which can be made by drafting.

Place of pattern study in the sewing course.—A very common practice in sewing courses is to start the making of each new garment by drafting the pattern for it. This not only makes it possible for the class to secure the patterns for their practical work, but the need for the pattern creates a motive for making it. In spite of the immediate practical value of this method of organizing instruction in drafting, there are several very strong objections to this plan. The sequence in the making of garments which most sewing teachers prefer is not the best sequence in pattern making. In most classes, the making of underwear precedes the making of shirtwaists which means that underwear patterns, which are really adaptations of waist and skirt patterns, must be

made before the patterns on which they are based. Another objection to this method of organizing drafting is that the instruction in pattern study is so broken up, and such long intervals of time elapse between drafting problems, that there is a serious loss not only in interest in pattern making, but also in failure to give power in pattern making. The most successful teachers of drafting realize that, in the making of patterns, some previous experience in the use of patterns and in fitting is most valuable as a basis for the realization of what the problems of pattern making really are. This would seem to indicate that the first problem in pattern study should be the use of commercial patterns rather than drafting.

The use of patterns is an elementary problem and instruction in this topic should be given during the first garment making courses. This topic includes: (1) the study of such general problems as the proper position of ~~warp~~ and ~~weft~~ threads in the different pieces of which a garment is made, the influence of the nap and pattern of a fabric on the placing of a pattern on the cloth, the necessity of having structural lines placed accurately on a ~~warp~~ or ~~weft~~ thread, etc.; (2) some experience in the placing of patterns on cloth of different widths and kinds; (3) experience in reading and interpreting the directions given in commercial patterns; (4) some study of the shape of the different parts of patterns; (5) the different ways of changing patterns to suit different measures such as increasing or decreasing the length or width of patterns.

If the use of patterns is studied in the elementary school, the class should be ready for an intensive study of pattern making and pattern fitting in the secondary

school. The most effective organization of pattern study is as a special unit of instruction in which the entire time of the class for a number of consecutive lessons is given to this problem. The amount of time that should be allowed for this topic will depend upon the character and length of the sewing course and the extent to which ability to make patterns is expected to result from such study.

At least ten class periods or two weeks' time must be given to the study and drafting of the basic waist, skirt and underwear patterns if a class is to secure the fundamental knowledge of pattern making that will make it possible for them to undertake the more advanced work in pattern making which is required in dressmaking and costume design courses. Pattern making, fitting, and costume design are so closely related that the modeling and drafting of patterns should assume a more important place in advanced courses. The pattern making in these courses should include the following problems: the drafting of a close fitting lining to be used in the making of the bust forms which are necessary for modeling; the modeling of a close fitting waist, semi-fitting waists, and plain skirts of different types; the making of original patterns by modeling and by using drafted patterns as a basis for the freehand cutting of patterns.

This advanced unit of pattern study is often divided between the sewing and the costume design courses. The modeling of simple patterns is so valuable as a means of teaching fitting that this aspect of pattern study is usually included in the dressmaking course. The making of original patterns is usually undertaken in a costume design course, for the position of essential seams or open-

ings and of such means of disposing of the fullness in a pattern as tucks, gathers, darts, etc., are so important an element in the design of many costumes that the relation of pattern making and costume design is most evident.

CHAPTER I

PRINCIPLES OF THE WAIST DRAFT

A COMPARISON of several plain shirtwaist patterns of the same size, including standard commercial patterns and those made by several drafting systems such as are used in school work, will show a marked variation in the shape of the patterns. In the smaller sizes, 32-38, the variations are not so great as in patterns for larger figures. These variations are of three types: minor differences due to such causes as placing the shoulder or underarm seams a little farther forward or back, or using a long or a shorter shoulder length or a small or larger neck or armsize measure; differences in commercial patterns due to the adoption of a different type of figure as a standard by the various patternmakers; and fundamental differences due to the inadequacy of some of the drafting systems.

Most drafting systems are worked out with the idea of producing a satisfactory pattern by as simple a method as possible in order to reduce the number of problems which must be considered by the person using the system. In many cases this has resulted in the use of mechanical devices and arbitrary rules for which it is extremely difficult to give a clear explanation. Each drafting system uses an individual plan for the drawing of a pattern, yet it should always be possible to explain by a demonstration on a figure the reason for the

method of drawing each line of the pattern; for the shape of all patterns are governed by a few general principles.

In the following discussions of the principles of waist patterns several systems are used to illustrate each principle that is considered in order to show the similarities or dissimilarities of various systems, and to give the basis for judgment of the excellence of each. The systems that are used have been selected because they are ones that are used very universally in home economics classes and because in addition they illustrate different methods of drawing. In order to keep the identity of each system, it is designated by the same letter throughout the chapter. No matter what point is being discussed, A B or C will always refer to a particular system.

1. Measurements

All drafting systems use some actual measurements of the individual for whom the pattern is to be made. In a few of the more mechanical systems only a limited number of measurements are taken such as the neck, bust, waist, and length of underarm, front and back. It is obvious that under these circumstances the width or length of all other parts of the pattern must be based on a proportion of those that are measured. The results of this are: that such systems are seldom able to explain their drawings in a convincing way; that the patterns that are produced conform in no way to the needs of the unusual figure; and that a slight inaccuracy in any of the measurements will be repeated in other parts of the pattern. If one of the purposes of drafting is to contribute to the knowledge of the characteristics of patterns and to the principles of fitting, it is most im-

portant that actual measurements should be used as much as possible in order to demonstrate the differences

TABLE I

MEASURES FOR SHIRTWAIST

(Taken on same person for different systems)

	Freehand System A	Freehand System B	Freehand System C	System Using Mechanical Aids
Waist	26	26	26	26
Neck	13	13	13½	13
Shoulder Lgth.	5¾	..	5½	..
Position of Front	4	Proportion of back length	7	..
Position of Back	1	Proportion of neck	5	..
Armsize:				
Front to pencil	6	..	7	..
Back to pencil.	..	..	5	..
Front chest ...	14½	14½	15	..
Position of ...	3" from neck	¼ of back length	Just above bust	
Back chest ...	14	14	13¾	..
Position of ...	3" from neck	¼ of back length	2" above scye	
Bust	37	36	37	36
Back bust	16	Proportion of back chest	..	..
Position of (scye)	7	½ of back length	7	..
Length:				
Front	15½	15½	15½	15½
Back	14½	14½	14½	14½
Underarm	7¾	7½	7¾	..

in shape that will result from variations in the proportions, carriage, or outline of different figures.

The table on page 15 shows the number of measures that are required for different systems. All figures represent actual measures, which have been taken for each system on the same person.

The variations in the size of the different measures are caused by differences in the position of the measure or in the method of taking it, for example: C requires a very low neck line in the front and a short shoulder, and the chest line is taken much lower than in the other systems; B uses fewer actual measurements and requires a closer bust line; the armsize measures in A and C are taken in different ways.

Taking measures.—The taking of measures is a very important part of pattern drafting. It is a type of work which requires judgment and accuracy. Measures are quite easy to take on some figures and more difficult on others, and students should have experience in measuring various types of figures in order to develop judgment in placing seams and in defining the best positions for arm and neck curves.

Waist measures are usually taken over a dress or waist, and it is most important that this garment should conform fairly closely to the lines of the figure, for bulky collars and big armholes increase the difficulty of measuring. The waist line should be clearly defined by a snug tape around the waist which should be placed as low on the waist as possible and curve down a little in the front. For beginners, it is an excellent plan to define the neck line, arm curve, and shoulder seam by a line of pins in order that measures taken from or to these lines will be accurate.

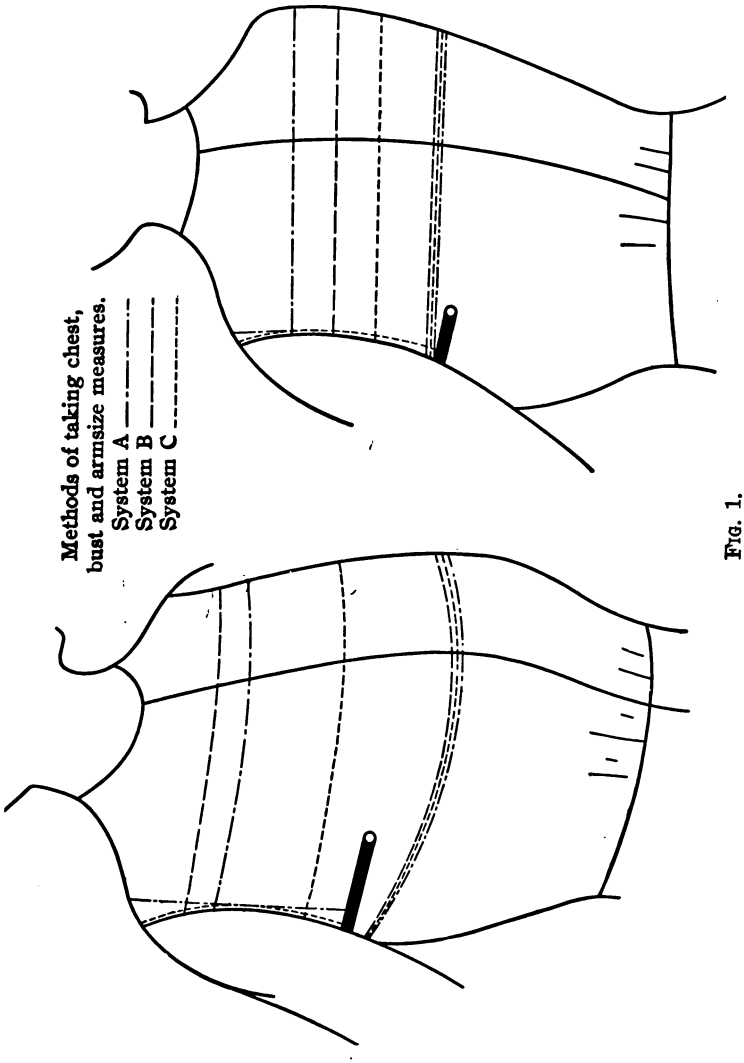

Methods of taking chest, bust and armsize measures.
System A
System B
System C

FIG. 1.

One of the most important points in the taking of measures is the necessity of taking all measurements in the position in which they will be reproduced on the pattern: if a line is to be drawn parallel or perpendicular to the center front or the center back line the measure should be so taken; if a line is to be drawn 3″ from the neck or 2″ above the bust line it should be taken at this point and not at an inch or two above or below. To take the chest measure perpendicular to the center front without curving the measure down over the bust seems to be a most difficult problem for beginners. Curving the measure will result in too large a chest measure and too long a shoulder position measure if this latter measure is to be taken from the chest line as in System A.

Position of seams.—The position and length of shoulder seams vary with the style of a garment, with the individual figure, and with whether a narrow or broad shouldered effect is desired. A seam placed directly on top can be fitted more closely to the curve of the shoulder than one placed farther forward or back, and it interferes less with the design of the garment. Shoulder seams on tailored waists are often brought forward onto the front to increase the square effect of the shoulder or to give a yoke line. The shoulder seam which is placed a little back of the top of the shoulder is the most usual line on tailored suits and on many dresses and waists. The best method of placing a shoulder seam is to decide on the position of the seam at the center of the shoulder and place a pencil on the shoulder to define the position of the line. A shoulder seam which has the shoulder end farther back on the figure than the neck end is always more becoming to a person than one which

slopes towards the front, as this gives a round-shouldered effect.

The position of the underarm and shoulder seams has always been an element in the effects that can be produced in waist making. A long shoulder seam sloping towards the back and an underarm seam placed far back and sloping towards the center back at the waist line did much toward producing the slender small-waist effect so much desired for many years. With the more normal waist size used at the present time, the underarm seam is usually placed directly under the arm.

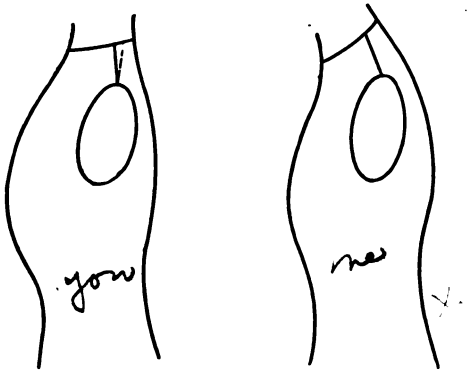
The arm curve is one of the most difficult seams to place in taking measures. Placing the thumb underneath the arm and following the line of the forefinger directly above it is probably the best method of defining the position of this curve. The neck line is much easier to find as it can be outlined by a tape around the neck so placed that the bottom of the tape comes about in the middle of the hollow at the bottom of the front neck. This measure should be taken rather tight.

Most measures are taken with the tape measure taut but not tight. It is most important that a person taking measures should place the ends of a measurement by an easily defined muscle or a prominent bone or a line of pins in order that the measure will be taken firmly and exactly. Bust and waist measures should be taken loosely, but the neck measure and the measure around the arm curve should be taken as snugly as possible, since a neck or arm curve that is too large is a serious fault in a pattern. In taking the bust measure the tape measure is held as loose and easy as possible and for *shirtwaist patterns 1″ or 2″ is always added to the actual bust measure* since the lines of a shirtwaist

should not closely define the curve of the bust. If commercial patterns are measured it will be found that a 36 inch pattern actually measures about 38″ which represents an addition of 2″. For very slender undeveloped figures the bust measure for a shirtwaist should not be taken the size of the bust but a measurement should be used that will give the outline desired for the waist. Tight fitting waists use a smaller bust measure.

Neck scales used in drafting patterns.—All freehand drafting systems and most of those that use mechanical appliances for securing the neck curve have some form of neck scale which gives the measurements to be used to locate the depth and width of the front and the back neck curves. Though it is possible to actually take neck measures on a person, it needs such extreme care in measuring that the use of scales has become almost universal.

The neck scales used by various systems show some variation in the measurements that are used and in the methods for changing these measurements for different neck sizes. Actual neck measurements will vary with the position of the shoulder seam which defines the front and back depth, with the position of the neck on the shoulders, and with the shape of the neck itself which in different people may show a wide variation in the width and depth of the oval of the neck curve. The neck scale adopted for any drafting system represents the decision of the originator of the system as to the shape of the neck that is best adapted to an "average" figure.



Effect of different positions of the shoulder seam and difference in the carriage of the head on neck measurements.

FIG. 2.

In most drafting systems it is expected that the exact shape of an individual neck curve will be secured by fitting rather than by the drawing. It is possible, however, by intelligent use of a neck scale to reproduce in the drawing of a waist pattern the characteristics of the individual neck. A slight increase or decrease in one or more of the measures of a standard neck scale will allow much variety in neck shapes. In making variations, however, it should always be remembered that it is safer to make a neck curve too small rather than too large, and, unless enough time can be spent on this problem to train the judgment of the class, it is safer to use the standard measurements for every one and rely upon fitting for modifications. A cardboard neck measure made with two strips of flexible cardboard placed perpendicular to one another on which is marked the

standard neck scale will be most useful in demonstrating the accuracy of a scale or the type of neck shapes for which variations in the measures should be made.

Method of taking neck measures with card board measure.

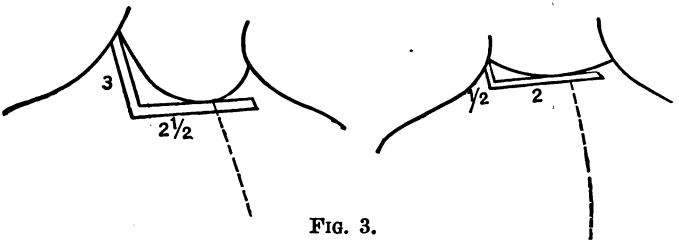
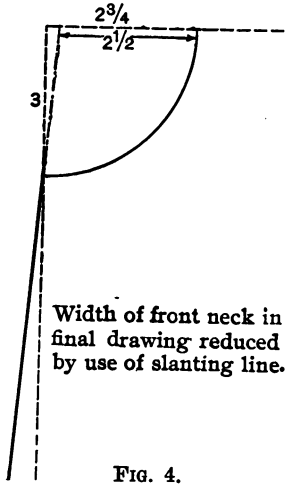


FIG. 3.

The slant of the center front line of a waist pattern is a factor to be considered in selecting or using a neck scale. In most free hand systems, the neck curve is made by drawing from a common point two lines perpendicular to one another on one of which is marked the neck depth and on the other the neck width; the curved line connecting these two points forms the front or back neck curve. The continuation of the line on which the front depth is taken is used in some systems as the center front of the pattern while in others this is merely a construction line on which measures are taken, the actual center front being drawn a little on a slant. The effect of using



Width of front neck in final drawing reduced by use of slanting line.

FIG. 4.

such a slanting front line can be seen in Figure 4. Drafting systems that require this slanting line use a larger front width measure in the neck scale than systems which use the construction line for the center front of the pattern.

TABLE 2

NECK SCALES FOR *13" Neck* FOR DIFFERENT FREEHAND SYSTEMS

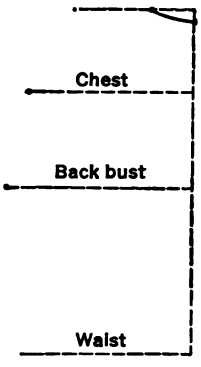
Systems	Front		Back		Increase for each Inch of Neck Measure
	Depth	Width	Depth	Width	
A	3"	2¾" (uses slanting center front)	½"	2"	Depth Width Front.. ¼" ⅛" Back... ⅛" ⅛"
B	1/6 neck plus ½"	1/6 neck plus ⅜" (uses slanting center front)	¾"	1/6 neck	Allowed for by taking proportion of neck
C	3¼"	1/6 neck	¾"	1¾"	Front depth increases to make neck curve measure ½ neck
D	2¾"	2⅜"	¼"	1⅞"	Front and back width increase ⅛"

From the preceding table of neck measures, it is evident that in System B the shoulder seam is placed farther forward and that in System C it is placed farther back than in System A. The neck curve made by the scale used in System D measures only 12 inches in place of 13 inches and the curve for a 14 inch neck will be even smaller in proportion as the measures for the depth of the neck do not increase with the larger size.

2. Back of Waist

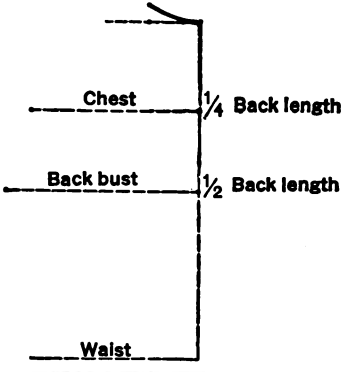
Most drafting systems start the making of the shirt-waist pattern with the drawing of the back of the waist. This is due to the greater simplicity of the drawing itself and to the assistance which knowledge of the problems of the back draft gives in explaining the more difficult front draft. There are usually some slight variations in the shape of the patterns drawn by different systems. Difference in the back neck scale is the cause of some slight variation in shape but the main factor is the extent of use of standard or arbitrary measures for some of the measurements rather than actual measures, as patterns which are made with standard measures are adapted to the "average" figure while patterns that use actual measures will vary in shape with the characteristics of the figures for which they are made.

Construction lines.—All free hand drafting systems use a number of foundation or construction lines which serve as a framework on which to draw the pattern. The final lines of a pattern seldom follow these construction lines, for their purpose is to define the width or length of the different parts of the pattern and to give a foundation from which the slanting or curved lines of the pattern can be drawn. The main vertical and horizontal construction lines of all patterns are drawn perpendicular to each other in order to keep the pattern true, and, since in most systems the position and the length of these lines correspond to the *measures taken on the figure,* it is most important to keep this same relationship in taking measures. In some systems all construction lines are placed by actual measures, while in others they are placed by arbitrary or standard measures.



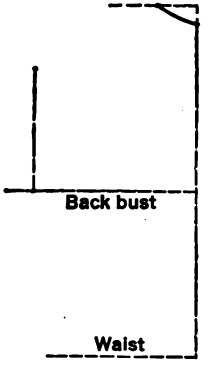
System A

Chest, back bust and waist lines placed by actual measure from neck.



System B

Back length actual measure. Chest and back bust placed by taking a proportion of the back length.



System C

Back bust and waist placed by actual measure from neck. No chest line used and chest measure marked on bust line.

FIG. 5.—Position of construction lines in different systems.

In the drawing of the back of a waist, the main vertical construction line is the center back line and the horizontal construction lines are the back chest, back bust, waist and neck construction lines. The number of construction lines and their position is usually quite different for each system though this difference is more marked in the draft of the front of the waist. The position of the construction lines of the back in Systems A, B, C and the corresponding position of the measures taken for each of these systems can be seen by comparing Figure 5 and Figure 1.

Placing the shoulder seam.—The two most important points in the drawing of the back of a shirtwaist pattern are to give the correct slope to the shoulder seam and to make the arm curve the right size and shape. The following drawings illustrate the methods used to place the shoulder seam in four different free hand systems. Systems A and C use actual measures taken on the figure which will vary with the characteristics of the figure for which the pattern is to be made: A measures up from the back chest line and C from the back bust line. System B measures up from the end of the back chest construction line an arbitrary measure—1/3 of 1/2 neck, while D extends the back chest line to 9½″ in order to give the line drawn from the end of the shoulder to this point a slope which will correspond to an average shoulder slant.

The position of the shoulder seam is one of the places where the advantage of actual measures over arbitrary measures is easily demonstrated. Systems B and D place the shoulder for the average figure, and ignore the sloping or square shoulder of the person for whom the pattern is being made. The method used by D is purely

mechanical and that used by B is illogical, for a person with a large neck does not necessarily have square shoulders.

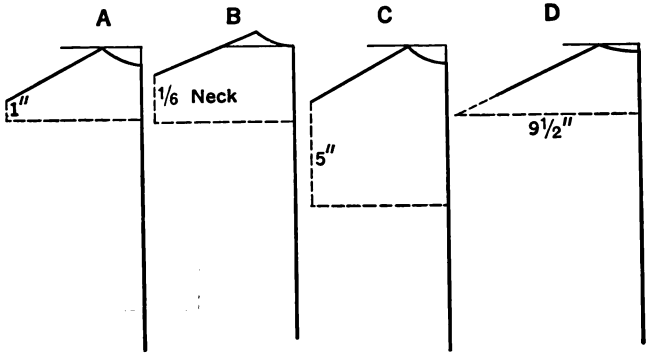
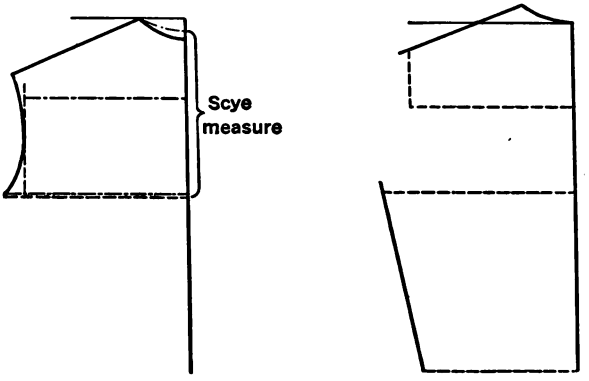


FIG. 6.—Methods of placing shoulder seam.

Another point that is illustrated by these same drawings is the two different methods of drawing the neck curves used by different systems. The slight advantage of the method used in B is that the vertical foundation line can be drawn the exact length of the back and does not need re-measuring. This difference in method has no effect upon the shape of the patterns, however; the differences in the neck curves of the drawings in Figure 6 are due to the use of the special neck scales of each system from Table 2.

Back arm curve.—The back arm curve is a very simple line to draw in most drafting systems as the ends of the shoulder length and back chest lines define two of the points which it touches. The point which locates the depth of the arm curve is found in all systems by one of two methods. (1) The most common method is to

take a measure from the center of the back neck line to a tape placed perpendicular to the center back line which passes around the body close up under the arm; *this measure is known as scye* and it locates the position of the line on which the end of the back arm curve is placed. (2) The second method used by only a few systems is to draw the underarm line up from the waist line, the upper end of this line being the end of the arm curve which is drawn after the underarm is completed.



Arm curve drawn before underarm. Systems A and C.

Underarm drawn before arm curve. System B.

FIG. 7.

Of these two methods, the first is not only more simple to explain but it is also more accurate, for Method 2 is dependent upon an accurately placed waist line. Observation of the back waist line on shirtwaists worn by different people will show: that this line seldom follows straight along the weft threads, but curves down towards the underarm seam; and that the amount of curve is

conditioned by how erectly the person carries herself and by the relative length of the front and back length measures which varies with different types of figures.

Underarm seam.—The length of the underarm is always an actual measure of the person for whom the pattern is to be made in all systems. The slant of the underarm is defined by the width of the back at the bust line and by the amount of fullness desired at the waist. The width of the back at the waist may be taken as an actual measure or as a proportion of the waist measure. The underarm seam is usually more satisfactory if placed a little nearer the back edge of the hollow underneath the arm rather than in the middle of this hollow, as it shows less from the front.

Use of the slanting center back line.—Several drafting systems use a center back line of the shirtwaist drawn on a slant rather than perpendicular to the crosswise construction lines as it is used in all of the preceding drawings. This may be due to the idea that, since most figures curve in at the center back at the waist line, some allowance should be made for this in the pattern. More careful observation would note that this curve only begins below the shoulder blades and that a line drawn to secure this effect could not be laid on a fold of material, which is a necessary condition in shirtwaist making. Another reason for the use of this slanting back line is that some systems depend upon this slant to give their patterns the right curve at the waist line; System B illustrates such a one. From the previous discussion it is evident that the waist line of B as drawn in Figure 7 does not correspond to the actual waist line. The following illustration shows the effect upon a waist pattern of using a slanting back line. The

same effect could be produced by altering the neck scale ⅛", by using a shorter measure to place the shoulder seam (1/2 of 1/3 neck minus ¼") and by carrying the underarm seam ½" below the dotted waist line.

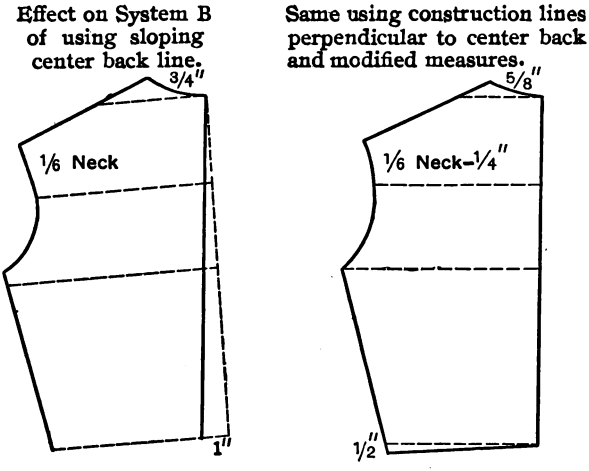
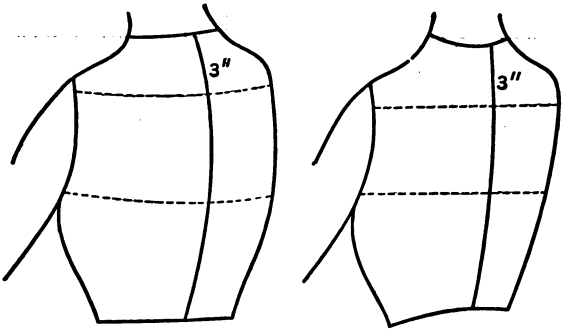


FIG. 8.

A sloping center back line is not an essential line in drafting a shirtwaist and it should not be used in systems which place the shoulder seam by actual measurements and in which the arm curve is drawn before the underarm seam.

Effect of different types of figures on back patterns. The most marked difference in the backs of different people is between those that are flat and those that are round shouldered. This difference should be reflected in the shape of the pattern which is used for each of these types of figures. In systems which use actual measures for the position and the length of all lines, the

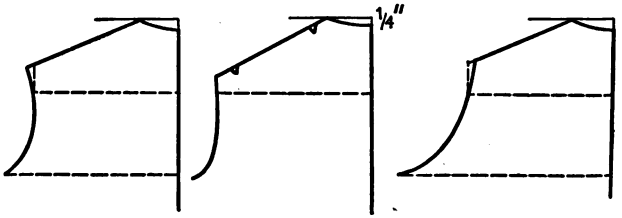
differences in the measurements of these two types of figures are most marked, and the resulting patterns vary accordingly. The measures of a round shouldered person show a broad back chest measure and a long scye measure. Since the armsize measures of a round shouldered person and an erect person may be the same, the longer scye measure of the first type of figure will result in producing a pattern with a more sloping shoulder line. The length of the shoulder line will, also, be affected by the broad back chest measure. This extra length of the back shoulder should be held in across the shoulders when the shoulder seam is basted to allow for the curve of the rounded back. Another characteristic of the back pattern for a round shouldered person is the decreased curve in the neck line.



5½	Shoulder length	5½
⅜	" position	1½
7½	Back chest	7
7½	Scye	7
15	Back length	14¼
7¾	Underarm	7¾

FIG. 9.—Measures of a round shouldered person and of an erect person otherwise similar in size.

The shape of the arm curve in a pattern for a person with a large bust and narrow shoulders and that for a slender person with broad shoulders is another of the variations seen in shirtwaist backs. Some systems make a rule that all shoulder seams should be drawn ½″ longer than the back chest, the extra length to be cut off in fitting when the person has narrow shoulders with a broad chest. A few drafting systems always make the back shoulder seam ½″ longer than the front shoulder, the back being held a little full when the shoulder seam is basted.



Broad shoulder and small bust. **Shoulder seam and neck curve for round shoulders** **Narrow shoulder and large bust.**

FIG. 10.

3. FRONT OF SHIRTWAIST

Since the fronts of shirtwaist patterns made by different systems show much variation in shape, it is most important to understand the reasons for this variation. Differences in the neck scales of different systems and in the extent to which standard or actual measures are used will affect the front draft in the same way that they do the back draft. These will produce only minor variations, however, that can be easily adjusted in fitting.

The most important cause of the variation in shape of

shirtwaist patterns made by different systems is that in many systems no plan is included for modifying the drawing of the pattern for large bust measures. That this factor is an important one is seen in the following drawing, which shows the outlines of patterns for 36 inch and 44 inch bust measures drawn according to two different systems, similar measurements being used in each case. The lines of the patterns for the smaller size show almost complete agreement in the two drafts while in the larger size there is a fundamental divergence.

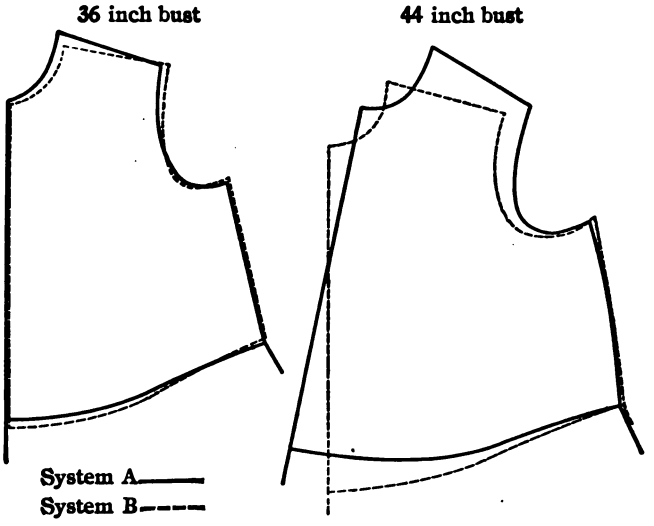


FIG. 11.

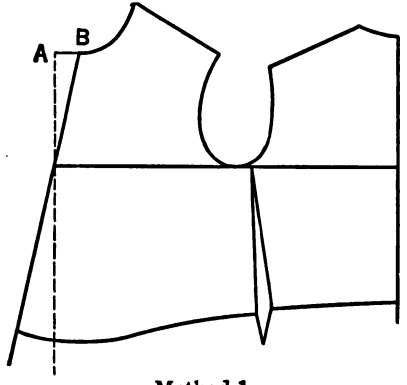
If two separate patterns are cut for the two 44″ drawings and these patterns held so that the under arm seams, shoulders and necks of the two patterns coincide, it will be found that pattern A will allow much

more spring over the bust. A large bust measure means not only a bigger measure around but an increased thickness through the body which intensifies the curve which the pattern must take from under arm to center front. This must be allowed for by an increase in the spring of the pattern if it is to fit closely to the arm curve.

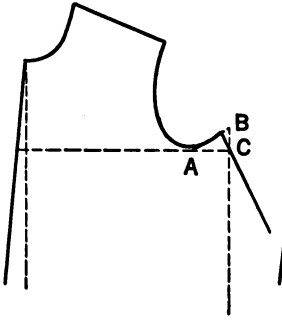
It is most important that in all drafting systems some plan should be included to secure this effect in the patterns for large figures. Three different methods have been used in various systems to accomplish this result and it should be possible to adapt one of these to almost any system:—

Method 1. This method can be used by systems which draw the back and front on a continuous bust line with the center front line placed on a slant as seen in Figure 12. In one system using this method, the line A—B is made 1/6 of the neck measure, which would increase the slant of this line with a larger neck measure. Though a larger neck measure usually accompanies an increased bust measure this is not always the case. A more satisfactory plan is to draw this line by a definite scale which varies with the bust measure—2″ for a 36 inch bust increasing ⅛″ for every inch of increase in the bust measure.

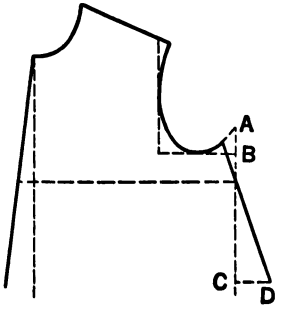
Method 2. This method can be used in systems in which the back and front are drawn separately. In several of the systems drawn in this way the lower end of the front arm curve follows the horizontal construction line which is drawn across the pattern at the position of the pencil in Figure 1. If this horizontal construction line is slanted upward at a point



Method 1.
Line A-B increases with increase in bust measure.



Method 2.
Line A-B slanted upward from the horizontal. Underarm line drawn perpendicular to slanting line.



Method 3.
Lines A-B and C-D increase with bust measure. C-D is drawn at bottom of underarm construction line.

FIG. 12.

about 1″ in front of where the arm curve and the construction line coincide it will give the modification of the arm curve which is needed for more spring. The underarm seam should be drawn perpendicular to this slanting line rather than perpendicular to the horizontal line as it is usually drawn in these systems. The amount of slant given to this line should vary with the size of the bust measure. For every 2″ increase in bust measure above 36 inches the line B—C should be increased about ¼″.

Method 3. This method differs from Method 2 merely in the details of drawing rather than in the principle of the drawing. The use of a construction line at the fullest part of the bust as well as at the pencil line allows for more exact drawing of the underarm seam. This method uses two scales: one for the line A—B and one for C—D.

A—B=½″ for 36 inch and smaller bust measures increasing ½″ for each 2 inches increase in bust measure.

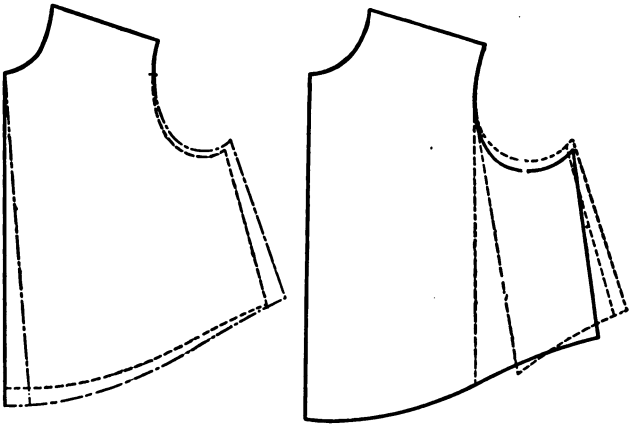
C—D=1″ for 36 inch and smaller bust measures increasing ⅜″ for each 2 inches increase in bust measure.

Of these three methods the last is the most satisfactory one to use in systems that have the front and back of the waist drawn separately. The use of this method necessitates the addition of a bust construction line to the construction lines used in the front draft. This line is not used in most systems but it is very simple to add it to any system. It should be drawn parallel to the line which defines the bottom of the arm curve, and it is placed in the position of the actual bust line under the

arm as seen in Figure 1 which is about 1¼″ to 1½″ below the bottom of the arm curve.

Methods of securing spring after pattern is made.— Most experienced people, who have used large sized patterns made by drafting systems in which no plan is made in the drawing for securing more spring across the bust with large bust measures, have secured the intensified arm curve which is required by changing the completed pattern. There are two methods of doing this: gashing the pattern parallel to the center front so that the gash will run into the arm curve at about the chest line and spreading the bottom

Pattern modified by swinging and gashing.



36″ used for full waist.
Cut lines ————
Outline before swinging - - - -
Completed outline —·—·—·—

44″ pattern by System B.
Original pattern ————
Same gashed - - - - - - - - - -
Underarm seam cut off to make bust measure the same.

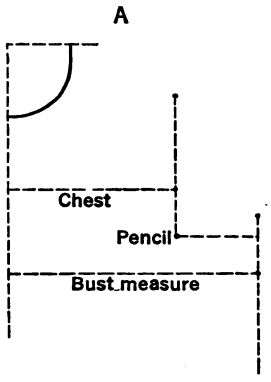
FIG. 13.

until the desired spring is secured; or when the material is being cut, swinging the whole pattern away from the center front *after the neck, shoulder and about two inches of the arm curve* have been cut. These same methods are often used when a close fitting shirt waist pattern is to be used for a loose shirt.

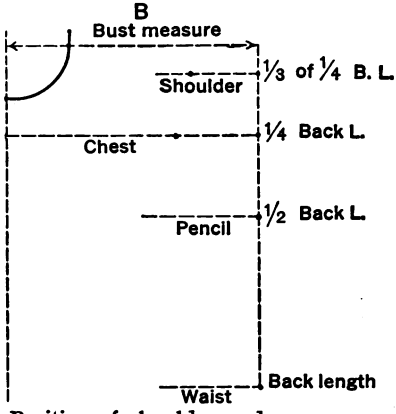
Both of these methods produce the same result—an intensified arm curve, a larger bust measure and greater fullness around the bottom. In order to maintain the same bust measure, the pattern can be cut off at the under arm which secures the other essential correction of these patterns, a smaller arm curve.

Basis of front draft in different systems.—It is most important that in using a drafting system the basis of the drawing be clearly understood. The great variety in the methods of drawing the front of a waist has made it necessary to select only the most typical plans in the following discussion. It is obvious that if the plan for the front can incorporate some of the methods used in the drawing of the back that it will greatly simplify the problems of the learner of the system. This point is considered in most systems; sometimes as in System B the back dominates the plan for the drawing of the front and makes the relationship of the lines less easily explained.

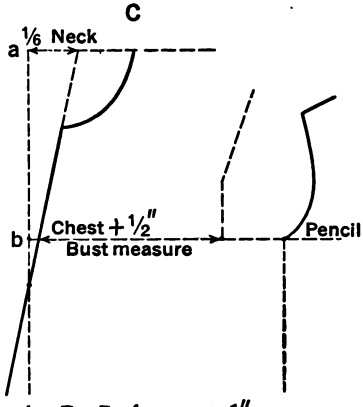
Position of shoulder.—The method of placing the shoulder seam used in the back of a pattern is generally repeated in the drawing of the front. This can be seen by comparing Figures 6 and 14. The front of System D is not shown but the method that is used is the same as that used in the back. The back of E is drawn by the same method as that used in C. System B is the only one of the group which uses a different



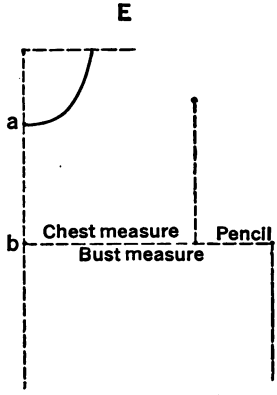
Chest placed 3″ below neck. Shoulder measured up from chest. Arm size measured down from shoulder to pencil. Bust line 1½″ below pencil line.



Position of shoulder and pencil line based on general proportions, not on measures.



A - B = Back scye + 1″
Broadest part of bust 1½″ below pencil line. Shoulder measured up from pencil. No chest line used.



A - B drawn by scale, not by measure. Shoulder measured up from pencil. No chest line used.

FIG. 14.—Construction lines used in different systems.

method for placing the shoulder in the back and front and in both back and front the measurement that is used is an arbitrary one selected because it is an easy way of securing an average shoulder slant.

Position of the arm curve.—The position of the bottom of the front arm curve is much less logically defined in most front patterns than it is in patterns for the back. A pencil placed under the arm as in Figure 1 shows the lowest point of the arm curve in both the front and back patterns. In drawing the back pattern, the position of the pencil is represented in the drawing by a construction line, the position of which is secured in most systems by taking the "scye" measure. This *pencil construction line and the back bust line coincide in all back patterns.* In taking the bust measure, the tape is placed in a straight line across the back on a line with the lowest point of the arm curve, and while the tape measure actually passes below the pencil at the underarm seam, because of curving down for the lower curve of the front bust line, it is simpler to represent the back bust by a straight line perpendicular to the center back than to attempt to reproduce the actual position of the tape used in taking the bust measure. The divergence between the positions of the pencil and of the actual bust line increases at the front of the waist as can be seen in Figure 1. This would seem to indicate that it would be more effective *to represent the bust line and the position of the pencil by two separate lines in the front waist draft* even though a single line represents both in the back. In most systems only one line is drawn, and that one in the position of the pencil line, though it is usually designated as the bust line, and the front bust measure is taken upon it. The chief dis-

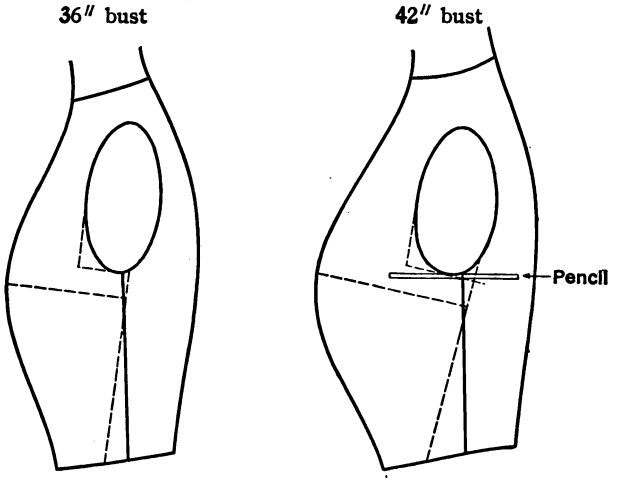
advantage of this plan is the effect upon the underarm seam and the size of the arm curve for one line may secure the correct position for the lowest point of the arm curve and define the bust size.

Strangely enough, there is practically no system which takes a front measure to place the pencil line similar to the scye measure of the back. In the systems illustrated in Figure 14 the pencil line is placed in the following ways: A measures down from the shoulder; B uses the same device used in the back—not an actual measure; C starts the drawing of the front with the pencil line which is a continuation of the back bust line and places the neck curve by measuring up on the front construction line scye plus 1″ which is an arbitrary measure not easily explained; E uses a scale rather than an actual measure for line A—B and the neck curve is drawn as in System A.

The underarm seam and the arm curve.—The bust measure is used in all systems to regulate the distance between the center front construction line and the underarm construction line which are always drawn parallel to each other. It is because these lines are parallel that most systems eliminate the drawing of the bust line and take the bust measure on the pencil line or on any other horizontal construction line. When the actual underarm line coincides with the construction underarm line or is drawn at a slight slant from this line, the actual position on the pattern of the fullest part of the bust is not particularly important. With a large bust measure it is most important however to designate this point in order to keep the *arm size* as *small as possible* and still keep the necessary size around the bust. This point is illustrated in Figure 12: Method 2 illustrates the use

of a very slanting underarm on a system which has only the pencil line and no bust line with the result that the arm curve and bust size are too large; Method 3 shows a slanting underarm, the width at the actual bust being regulated by a bust construction line placed parallel to the pencil line and about 1½″ below it, which is the usual position of the actual bust under the arm.

The amount of slant given to the underarm line should vary with the size of the bust measure, in order to maintain the same relationship between the arm curve and the underarm seam as the arm curve changes in shape to allow for greater spring across the bust. This point is illustrated by the following drawings which show the relation of the actual underarm seam and the arm curve to the underarm construction line and the



Comparison of underarm seam and underarm construction line in patterns for different figures.

FIG. 15.

pencil line on a slender figure and on a figure with a large bust measure. The position of the actual bust line is not shown in order to simplify the drawings but its relation to these lines can be easily demonstrated on some person. The actual position of the pencil is shown in the second figure. This illustrates the divergence in the position of the pencil construction line and the pencil itself in the drawing of a pattern for a large bust measure and explains the principle which underlies the use of Methods 2 and 3 in Figure 12.

The arm curve.—In many systems, the drawing of the arm curve is simplified by the use of a curved rule of card board, wood, or metal which is placed so that the curve coincides with the points that define the position of the curve at the shoulder, chest, and underarm. In free hand systems which have no such device for outlining the arm curve, it is necessary to define enough points so that the arm curve will not be drawn with too deep or too shallow a curve. The end of the shoulder, the chest width, the pencil line, and the point *above* the pencil line which defines the intensity of the curve are the essential points on all systems which draw the front pattern as a separate pattern. It is possible by drawing additional construction lines to devise other points to define the position of the curve, but this is not necessary if the shape of arm curves in commercial patterns and in fitted and modeled patterns are studied before the students attempt to draw such curves.

A properly placed shoulder seam is usually perpendicular to the arm curve on the shoulder and in drawing the pattern the arm curve should be *started at a right angle to the shoulder seam.* Occasionally an idiosyncracy of figure or a special effect in design may require a

shoulder seam at a different angle. The seam so placed should be outlined by pins on the person for whom the pattern is to be made so that the angle of the arm curve and shoulder seam can be seen and duplicated in the drawing of the curve. The arm curve is a continuous curve which starts perpendicular to the shoulder seam, touches the line or point which defines the width of the chest, touches the pencil line at a point which will vary with the relationship of the width of the shoulder, chest and bust measures, and, finally, curves up above the pencil line. The amount which the end of the arm curve is raised above the pencil line should vary with the size of the bust measure as was shown in Figure 15.

If this line is drawn as a continuous curve not as a series of connecting lines there will be no difficulty with securing the correct shape of the arm curve.

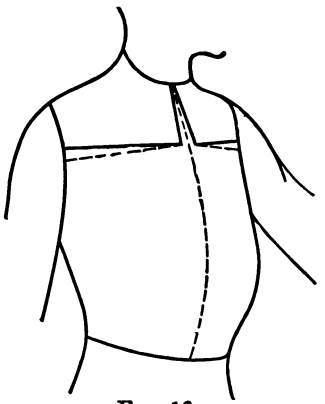


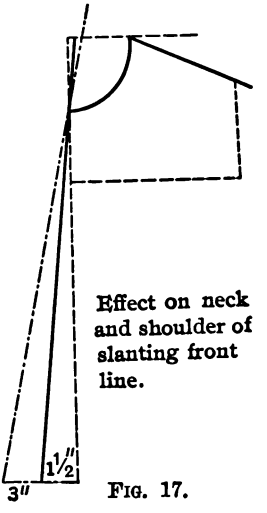
FIG. 16.

Slant of center front line.—In most drafting systems, the front chest measure is taken perpendicular to the center front line, and, in the drawing of the pattern, the chest line is drawn perpendicular to the construction line which represents the center front of the pattern. If, after the neck, shoulder, and arm curve of a pattern are drawn, a deep yoke is cut out of soft paper or cloth with the center front construction line on a fold and the chest line marked clearly, it will be found on putting this yoke on the person for

whom it is made that in most cases the chest line slopes down at its ends. To make the chest line coincide with the horizontal position in which this measure was taken it will be necessary to gash the yoke at the center front and spread the bottom until the chest line assumes the correct position.

It will be found that the amount that the ends must be spread *will vary with the fullness of the chest.* A very hollow chested person will require almost no spread, while a person with a fuller chest or a pigeon breasted person will require about an inch or more. A very high bust will, also, affect the direction of the chest line though this is not a usual factor. The size of the bust has no influence on this problem unless through tight corseting the bust is pushed up.

In the drawing of a pattern, allowance is made for this curve of the chest by the use of a slanting front line. This line is used in most systems, though a few cut the center front of the waist on the vertical construction line with which most patterns start the drawing of the front. The amount of slant given to the front line varies rather arbitrarily in different systems. From the preceding discussion, it is evident that, more correctly, the amount of slant should vary with the fullness of the chest, for slanting the front line more



Effect on neck and shoulder of slanting front line.

FIG. 17.

than is compensated for by the chest curve will result in a pattern too narrow in the neck, too square in the shoulders, and with a chest line slanting upward at the arm curve. The slant of the front line is regulated by measuring out from the center construction line at the waist. Average figures use from 1″ to 2″ depending upon the chest curve.

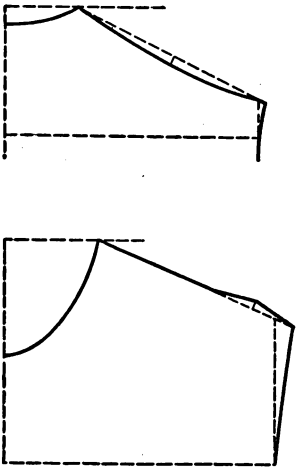
Neck curve and extension below waist.—As in the drawing of the arm curve, many systems use a curved rule for drawing the neck. This is not an essential appliance for it is very simple to reproduce the curve that is found in satisfactory waist patterns. It is an excellent plan to draw several different curves on a piece of soft paper, and fit these around the neck of a figure or some person in order to see the intensity of the curve that will give the best neck line.

Many drafting systems give detailed directions for drawing the extension that is added below the waist in a shirtwaist pattern. The slant or curve of the underarm seam over the hip is the objective of these directions. The most usual device is to connect the points where the neck and shoulder seam and the waist and underarm seam join by a dotted construction line; the continuation of this line below the waist gives the hip line. The same points are used for the extension in the back draft. The actual slant of the underarm seam over the hip will depend upon the relative size of the waist and hips of the person for whom the pattern is made. This is only a minor point in the drawing of a shirtwaist pattern, however, as the exact slope of this seam is usually secured by fitting. There is no objection, therefore, to the use of any simple device for securing a reasonable slant to the hip line.

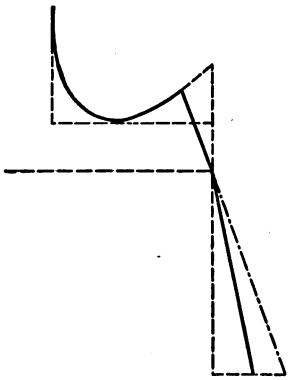
The shape of the front waist line will vary with the amount of blouse that is desired in the front, with the amount of downward curve given to the waist line, and with the carriage of the person for whom the pattern is made. The waist line is a curved line based on a construction line drawn from the end of the underarm line to a point which marks the front length on the center front construction line. The waist curve follows this construction line for about 4″ from the underarm seam and curves down so that the waist line across the front is perpendicular to the center front line.

Minor variations in the shape of patterns.—Many waist patterns, especially those for large figures, have a front underarm seam that is curved rather than straight as it is drawn in the preceding drawings. This shaping of the underarm seam reduces the amount of material which must be fitted in at the waist line without decreasing the amount of material across the bust. While this modification of the pattern could be made during the fitting, it may eliminate the necessity of refitting the underarm seam if it is shaped in the original pattern. The method of drawing this modified underarm seam is illustrated in Figure 18. In the back, this seam is left usually as a straight line.

Shaping of the shoulder seam is another modification that will result in a more adequate pattern. Very few systems use this modification, however, as the shape of the neck curve and the shoulder seams vary so with the carriage of the head and the shoulders, that the shoulder seam is almost invariably refitted when the pattern or waist is tried on. A straight shoulder line and ample seam allowance is all that is really necessary for the shoulder.



Shaped shoulder seam.



Shaped underarm seam for large bust measures.

FIG. 18.

4. METHOD OF DRAFTING SHIRTWAIST BY SYSTEM A

In drafting a pattern, the first step should be to study the sequence in which the drawing should be made so that when the actual drawing is started the making of the pattern will be seen as a whole rather than as drawn from line to line. The very common practice of using letters or numbers to designate the lines of a pattern or the points from which lines are to be drawn tends to center attention on the mechanics of drawing rather than on the conditions under which each line should be drawn. If the positions of all the lines used in a pattern are demonstrated on a lay figure or on a member of the class, each line should be recognized as serving a definite function and should be called by its name when the draft is demonstrated or drawn.

In the following detailed directions for the drawing of a shirtwaist pattern, the use of letters and numbers has been eliminated. System A has been selected as an illustration because this system embodies all of the points that are developed in the previous discussions. Directions for making patterns by any of the other systems are already available in printed form in clothing texts or in drafting manuals.

SHIRTWAIST DRAFT

MEASUREMENTS USED IN FIGURE 19

	37 Inch Pattern	44 Inch Pattern—Front Only
Waist	26	..
Neck	13	13½
Shoulder	5½	5
Position of front	4	4½
Position of back	1	..
Armsize—front	6	6¾
Front chest	14	15
Back chest	14	..
Bust	37	44
Scye	7	..
Back bust	16	18
Front length	15½	16
Back length	14½	..
Underarm length	7¾	8¼

A. *BACK*

Problem I. *Drawing the Neck Curve.*

The drawing of the back starts with a center back construction line and a neck construction line that are drawn perpendicular to each other, and on which are marked the measures of the back neck scale (page 23). The neck curve is drawn next, since all the

waist measures are taken from the neck curve and all lengthwise measures on the drawings must be taken from this curve.

Problem II. Drawing the Construction Lines.

All construction lines are to be drawn parallel or perpendicular to one another.

A. Center Back Construction Line.

On this line the position for the chest, back, bust and waist lines are measured from the neck curve. This construction line becomes the center back line below the neck curve.

B. Back Chest Line

1. Position.

This line is placed 3″ from the neck in both back and front for all waist patterns. This is a standard measure selected because it usually marks the fullest part of the chest. This measurement can be increased or decreased if this seems advisable, but the same distance from the neck must always be used in taking the chest measure and in the drawing.

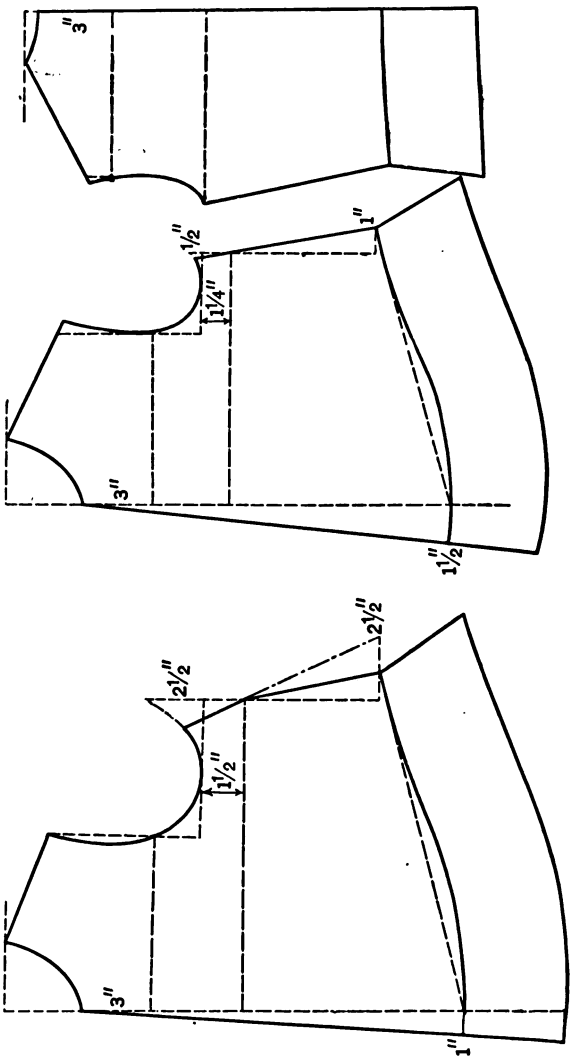
2. Length.

The back chest line is drawn ½ of the width of the back from arm seam to arm seam.

C. Back Bust Line.

1. Position.

This line is placed by the scye measure described on page 28. This measure will vary with the character of the figure for which the pattern is being made.



37 inch bust with broad shoulders and full chest. Measures as in Table I.

44 inch bust with narrow shoulders and flat chest.

FIG. 19.—Shirtwaist draft—System A.

2. Length.

The back bust line is made ½ of the width across the back from underarm seam to underarm seam.

D. Waist Line.

1. Position.

This line is placed by the back length measure.

2. Length.

The length of this line varies with the amount of fullness desired at the waist. One fourth of the waist is a measure commonly used.

Problem III. Drawing the Shoulder Line.

A. Position of the Line.

The shoulder position measure is used to place the end of the shoulder. This measure is taken up from the end of the back chest line to the shoulder seam, the measure being taken *parallel* to the center back line. For average figures this measure is about 1″ but it varies with the height of the shoulders and the curve of the back of the individual.

B. Length.

The shoulder line is drawn from the end of the neck curve through the shoulder position point, and extended to the length of the shoulder. Figure 10 illustrates a shoulder length which is narrower than the back chest width but this is not usual.

Problem IV. Drawing the Arm Curve.

The arm curve is drawn from the end of the shoulder seam, through the end of the back

chest line to the end of the back bust line. The shape of this curve between the back chest and back bust lines should be carefully studied and tested on a figure.

Problem V. Drawing the Underarm Line.

The underarm line is drawn from the end of the arm curve through the end of the waist construction line, and it is made the length of the underarm measure. The bottom of this line usually falls below the waist construction line, though with round shouldered people is may end at the construction line. With a few abnormal figures this line may end above the construction line, but, unless the cause is plainly evident, this is usually due to badly taken measures such as a back measure too long, scye too short, or underarm too short.

Problem VI. Drawing the Extension.

A. Waist Line.

The waist line is usually a slightly curving line drawn from the end of the back line to the end of the underarm line.

B. The Extension.

The extension on a shirt waist is usually made 3 or 4 inches in length, the bottom being drawn parallel to the waist line. The center back line is extended with a straight line and the underarm line with an outward curving line. The amount of spring that must be allowed over the hips in this curve will vary with the amount of fullness allowed

at the waist line and with the relative size of the waist and hips of the person for whom the pattern is being made.

B. *FRONT*

Problem I. Drawing the Neck Curve.

The drawing of the front begins with a center front construction line and a neck construction line as in the back. The shape of the front neck curve is most important and it should be carefully studied before drawing.

Problem II. Drawing the Construction Lines.

A. Center Front Construction Line.

On this line are placed the front chest line and the point which marks the front length.

B. Front Chest Line.

1. Position.

This line is placed, as in the back, 3″ below the neck curve and perpendicular to the center front construction line.

2. Length.

The length of this line is one half the measure from arm seam to arm seam.

C. Shoulder Construction Line.

1. Position.

This line is placed, as the measure is taken on the figure, parallel to the center front construction line above the arm end of the front chest line.

2. Length.

This line is drawn the length of the front

shoulder position measure which is taken from the end of the chest line to the shoulder.

D. Pencil Construction Line.

This line defines the lowest point of the arm curve. It is placed by extending the shoulder construction line below the chest line until the distance from the shoulder is the length of the front armsize measure. At this point the pencil line is drawn parallel to the chest line.

E. Bust Construction Line.

1. Position.

This line is drawn parallel to the pencil line 1¼″ to 1¾″ below it. The greater distance is only used for persons with a low full bust.

2. Length.

The length of the bust line is found by subtracting the back bust from the bust measure and dividing by two.

F. Underarm Construction.

1. Position.

This line is drawn parallel to the center front construction line at the end of the bust line.

2. Length.

The upper end of the underarm construction line extends above the pencil line and defines the highest point of the arm curve. The distance above the pencil line varies with the bust measure according to the following scale:

36	inch	bust	½	in.	above	pencil.
38	"	"	1	"	"	"
40	"	"	1½	"	"	"
42	"	"	2	"	"	"
44	"	"	2½	"	"	"

The underarm length is used to define the bottom of the underarm construction line, but this length is not measured from the top of the line. The reason for this is easily seen in the 44 inch pattern in Figure 19. The actual underarm line and the underarm construction line are not the same length in this drawing due to the cutting off of the arm curve by the slanting underarm line; because of this, the length of the underarm construction line is measured from a point about ½" to 1" above the pencil line in order to bring the lower end of the underarm construction line to the actual waist line.

Problem III. Drawing the Shoulder Line.

The shoulder seam is drawn from the end of the neck curve through the end of the shoulder position line, and is extended until the line is the length of the shoulder measure.

Problem IV. Drawing the Arm Curve.

The arm curve is drawn from the end of the shoulder seam through the end of the chest line, touches the pencil line at about the middle of this line, and, curving upward, ends at the top of the underarm construction line. The arm curve is started perpen-

dicular to the shoulder seam and is drawn as a continuous curve.

Problem V. Drawing the Underarm Line.

The slant of the underarm line varies with the bust measure. This slant is secured by drawing at the lower end of the underarm construction line a perpendicular line the length of which varies according to the following scale:

36	inch	bust	1	in.
38	"	"	1⅜	"
40	"	"	1¾	"
42	"	"	2⅛	"
44	"	"	2½	"

The underarm line is drawn from the end of this last construction line *through the end of the bust line* to the arm curve. For large bust measures the excessive slant of the underarm seam can be reduced *below* the bust line.

Problem VI. Drawing the Center Front Line.

The slant of the center front line varies with the fullness of the chest of the person for whom the pattern is to be made. The amount of slant is measured at the waist line; 1″ to 1½″ is used for most figures.

Problem VII. Drawing the Waist Curve.

The waist curve is based on a waist construction line that is drawn from the lower end of the underarm line to the position of the waist on the center front construction line.

Starting at the underarm seam the waist curve follows the waist construction line for about 4″ and then curves downward so that across the gathers of the front the waist curve is about perpendicular to the center front line.

Problem VIII. Drawing the Extension.

The extension in the front is drawn in the same way as in the back.

SEAM ALLOWANCE

Shoulder and under arm seams	1 inch
Neck	¼ inch
Arm curve	⅜ inch

EXERCISES FOR CHAPTER I

1. Explain the variations in each of the following measures in Systems A and C:
   a. Difference in length of front armsize measure.
   b. Difference in neck size.
   c. Difference in shoulder length.
   d. Difference in chest width.
   e. Difference in position of front shoulder.
2. How would you expect the measures for the front of a shirt-waist to vary for two people of about the same size, one of whom was round shouldered and the other erect in carriage?
3. What is the scye measure and how is it to be used in a draft?
4. Explain why the same effect is produced by the use of Method 1 as is produced by the use of Method 3 in Figure 12.
5. Are there any advantages in the use of a single construction line to represent the pencil and bust construction lines?
6. Work out a rule or method for placing the bust construction line by a measurement taken from the neck curve down to this point.
7. Describe the characteristics of a figure that would require a

center front line drawn 2″ out at the waist line from the front construction line.

8. Explain the difference in the position of the construction lines in the two drawings in Figure 15.
9. What effect upon a pattern made by System A would be the use of a front shoulder position measure taken inaccurately 1 inch too short?
10. Can you give any explanation for the use of scye measure plus 1″ to place the neck construction line in System C of Figure 14?
11. Select a drafting system which shows no variation in the shape of the arm curve with different bust measures and incorporate into it one of the methods of securing greater spring in the pattern for large bust measures.

CHAPTER II

PATTERNS BASED ON THE SHIRTWAIST DRAFT

1. Underwear

Corset cover, chemise, and night gown patterns are usually drawn on the same basic plan as the shirtwaist pattern. Because of this it is always possible to cut these patterns from the shirtwaist pattern without going through the drafting process. In many schools, the making of underwear precedes the making of waists, and, since drafting is done to secure the patterns for the articles that are made, special drawings are made for each garment. The study of pattern making as a special topic should make it possible to consider underwear patterns in their logical place as modifications of the shirtwaist pattern.

The shape and character of the garments used for underwear are constantly changing, and the clothing teacher who does not adapt her pattern making to the needs of her class is limiting the effectiveness of her course. To retain in a clothing course the making of a garment for which the majority of the students have no use creates a loss in interest which is not compensated for by the opportunity which the garment may offer for giving experience in different forms of sewing construction. With the increasing use of ready made muslin and knit underwear, it is most important for clothing teachers to consider carefully the amount of underwear

pattern making that will be profitable for a particular class. The following underwear drafts are selected because they illustrate different principles.

Corset cover patterns.—Corset cover patterns are of three types: those that have no fullness across the top of the bust and a good deal of fullness at the waist; those that have fullness at the top and bottom; and those that have a small amount of fullness at the waist and more at the neck line. These represent types that are adapted to different kinds of figures. The first type is seldom used except by women with a full bust, while the third type can be used very successfully to increase the apparent size of the bust for slender figures. The most usual corset cover pattern is one which has a small amount of fullness at the waist and at the top. The corset cover made of a straight piece of material cut the length of the underarm seam with a casing or beading at the top and bottom and straps across the shoulder is a type which is very generally in use but for which no special pattern is necessary.

In adapting a shirtwaist pattern for a corset cover, the first step is to cut off the extension below the waist and to cut the top down as low in the front and back and as narrow on the shoulders as seems desirable. If the shirtwaist pattern allows for any blousing, it is evident that this must be cut off for underwear patterns. A corset cover may be tight fitting across the back, or it may have fullness at the waist as a shirtwaist has. Since the top of a corset cover at the center back is usually cut below the curve of the shoulders, it is possible to use a slanting line in the center back to take out some of the fullness at the waist without this affecting the shoulders as it does in the shirtwaist pattern. The front of a

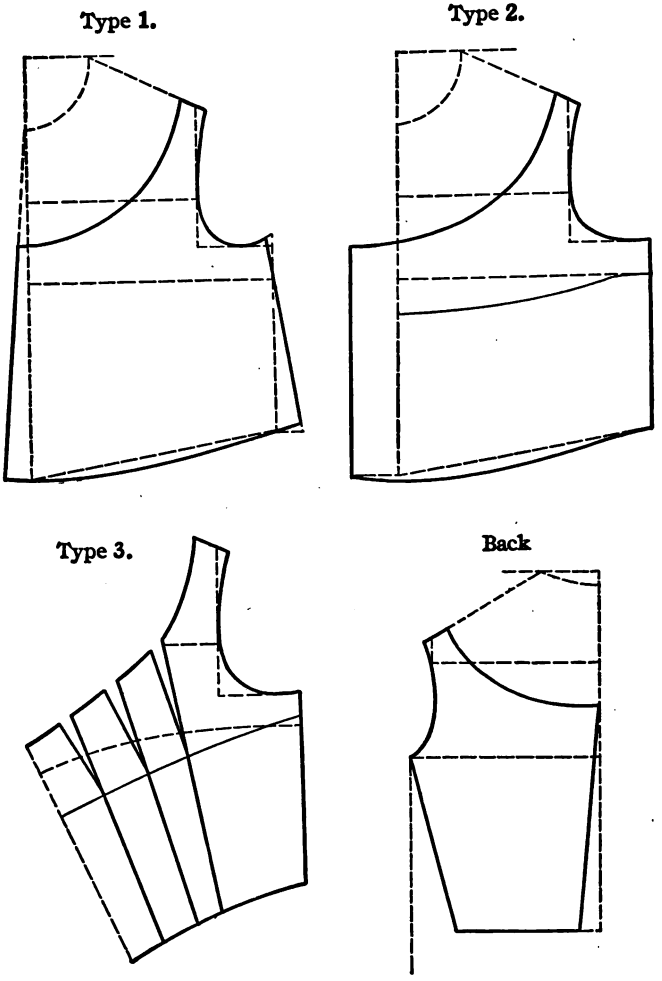


FIG. 20.—Corset cover patterns.

corset cover differs from the front of a shirtwaist in being less close fitting around the armhole, and in allowing for fullness over the bust by gathers at the bust and waist, rather than by the spring secured by intensifying the arm curve and slanting the underarm seam. Most corset cover patterns with the exception of Type 1, which is virtually a waist pattern cut low in the neck, use the center front construction line and the underarm construction line for the front line and the underarm seam, and the end of the arm curve follows the pencil line rather than being raised above it.

Fullness across the bust can be secured in a corset cover by adding extra material in the front to any desired amount if this extension is made an equal amount at the waist and at the top. If more fullness is added to the top than to the waist line of a corset cover, the result will be that the center front of the pattern will not be perpendicular to the neck or bust line, and when this pattern is tried on it will be found that the front does not curve down properly to the waist line, and that the extra fullness sticks out in the middle of the front and cannot be spread easily across the front of the corset cover. This illustrates a fundamental law in drafting. *Fullness can be added parallel to any line and the extra width or length held by tucks, gathers, etc., but fullness added to one part of a line and not to another changes the relationship of the adjacent lines and necessitates a change in the drawing of these lines.*

By changing the method of drawing the waist line and neck curve, which are the two lines adjacent to the center front, a corset cover pattern can be drawn which increases the fullness across the top of the pattern and decreases it at the waist. This can be done in a much

simpler way by gashing and spreading a standard pattern than by making a special drawing. Gashing and spreading a pattern is the simplest and most effective way of adding fullness at any point where it seems desirable. To secure the effect that is desired, it is necessary to make the gashes or cuts in the pattern at the place where the fullness is required or desired. In the case of the corset cover the increased fullness at the top should be spread across the whole front, not concentrated in the center of the front, and the gashes should be placed accordingly.

The gashed corset cover pattern illustrates another point in the use of gashing as a method of modifying patterns. In Figure 13, where gashing is used to increase fullness across the bust, the gash is made entirely across the pattern and both the bottom of the waist and the bust measure are increased. In the corset cover the same size around the bust is maintained and the top is increased and the bottom decreased. This effect is secured by spreading the gashes at the top and lapping the cut edges at the bottom. Fullness cannot be taken out of one part of a pattern without a corresponding increase in the opposite part unless a dart is used.

Chemise patterns.—Chemise patterns are less close fitting than corset cover patterns and follow less closely the lines of the shirtwaist pattern. In some cases, the only differences to be noted between the back and front of a chemise is the lower neck in the front and the narrower width of the back, for if the shoulder seam and underarm seam are both placed farther forward than in the waist pattern, the shape of the arm curve will be almost identical in back and front. Another point of similarity in chemise patterns is that the underarm seam

of the back and front are always cut at the same slant. Figure 21 shows a chemise pattern which retains the position of the shoulder and underarm seams as in the shirtwaist pattern.

In making a chemise pattern, the length, the fullness across the front and the width across the bottom should be regulated by the desires of the wearer rather than by any regulation measurements. The most satisfactory plan for deciding upon these measures is to have each member of the class measure some garment that she has

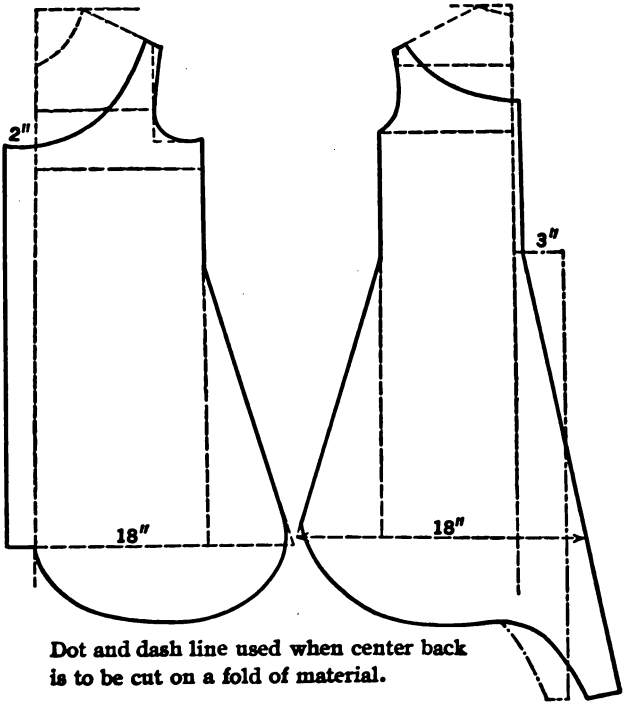


FIG. 21.—Chemise pattern.

found satisfactory, and use this as the basis for the pattern. The 2 yard width at the bottom with 4″ extra fullness across the bust used in the drawings in Figure 21 represent measurements often used in ready made envelope chemises. The shape of the bottom of the chemise will depend upon the fancy of the wearer. A straight chemise is usually cut straight across the bottom, while an envelope chemise may be straight with a straight extension in the back or it may be shaped to give an irregular line of trimming at the knee.

Chemises may be made with a seam in the center back or with a fold in the center back. When a fold is used, the extra width that is allowed to make the pattern wide enough at the bottom is usually cut off above the waist line. This will make a seam from the neck to the waist with the fullness below the waist held in an inverted box plait. The shaped underarm seam and center back seam used in Figure 21 can be replaced by a straight slanting line if more fullness is desired at the waist.

Night gown patterns.—There are two types of night gown patterns used in school work, the kimono night gown and the night gown with set-in sleeves. The kimono night gown is the one most used with elementary classes and it represents the simplest problem in pattern making. In many schools no paper pattern is made for this night gown, the lines for the gown being drawn directly on the cloth. It is possible to use this method because the back and front are identical with the exception of a lower neck line in the front and the shoulder line is placed on a crosswise fold of the material.

The night gown with set-in sleeves offers practically the same pattern making problems as the chemise with the exception that the neck is cut higher, the underarm

seam is not shaped, and the pattern is cut floor length in place of knee length. Night gown patterns may be cut with a slanting back seam or with the center back on a fold of the material. The latter is the most satisfactory method, the extra width across the back being held in with gathers or tucks at a yoke line or across the back neck.

2. Tight Fitting Waist

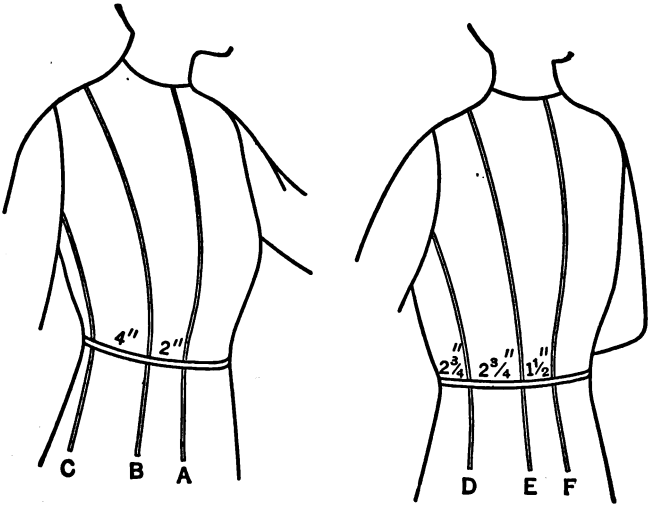
Tight fitting waist patterns may be made by drafting or modeling. An inexperienced person is usually more successful in fitting a drafted or commercial pattern than in modeling a pattern on another person. A skilled person, however, finds it a much simpler problem to model a tight lining directly without giving thought to the process of drafting a pattern. A tight fitted waist lining may be used as a foundation on which to drape gowns of wool or silk, but the extent to which such a lining is used in dressmaking varies greatly with the style of costumes that are being worn. Because of the very limited use of these patterns, little emphasis is given to making a tight waist draft by many clothing teachers. One of the most important problems in a sewing class, however, is to secure for each pupil a form which as nearly as possible resembles her own figure in order that she may have the extended experience in fitting, draping, and modeling that is not possible when all fitting must be done on another person. In making these forms, a lining is cut from a drafted or commercial tight waist pattern and this is fitted on the figure. While a commercial pattern may be very satisfactory for average figures, a tight fitting pattern adapted from a perfect fitted shirtwaist pattern will be even more

satisfactory, and, in the process of making this pattern, it is possible to demonstrate many points in regard to the best lines for different figures.

A tight fitting waist is based on the idea of securing a close, smooth fit with the use of as few seams as possible, every seam being placed so as to give the most graceful lines to the figure. The position of the seams in a close fitted waist is always influenced by the characteristics of the figure of the individual and by the effect that is desired in the lines of the figure with different styles. During the period when a small waist and a wide shoulder effect was desired, the side back seam outlined a very narrow panel at the waist in the center back which curved outward until the seam ran into the arm curve. The unbroken shoulder line in the back gave an effect of width and the inward curving line created an impression of slenderness in the waist. The front of the tight waist pattern at this same time was made with two darts from the fullest part of the bust to the waist with an unbroken width above as in a shirt waist. With the larger waist measure and the straight front effect used at the present time, the side back line is placed so that it runs into the shoulder, and the extra material in the front is taken out in a single dart, the seam of which is continued in a side front seam which runs into the shoulder seam. The long seams running from the shoulder to the waist allow for more perfect fitting and at the same time they can be so placed as to accent or decrease the apparent size or curve of the figure.

Position of seams in tight fitting waist.—In order to find the best position for the lines of a tight fitting waist on a particular person it is an excellent plan to place a

tape measure snugly around the figure at the waist line and hold or pin pieces of tape so that they will define the position of the seams as in Figure 22. If the tapes are passed under the tape measure at the waist and held firmly it will be found to be comparatively simple to adjust them back and forth until the most satisfactory position for each line is found. For very slender figures a tight fitting waist can be made with center front, side front, center back, side back and underarm seams; for a fuller figure an underarm piece is generally used which makes a front and back underarm seam. The two most difficult lines to adjust are the side front line B and the front underarm line C.



Tapes placed to show position of seams in tight fitting waist and average width of each piece of the pattern at the waist line with a 26 inch waist.

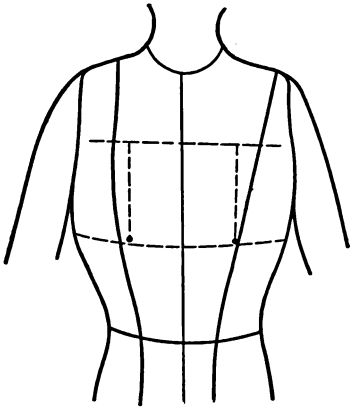
FIG. 22.

The appearance of the front of a tight fitting waist is largely influenced by the position of seam B. When the pattern that is being made is for a lining, the position of this seam should conform to the needs of a good fit without considering the effect on the appearance which can be secured by varying the position of the line. When this line is to be used in making a close fitting pattern for a princess slip or some outside garment, its position is more important.

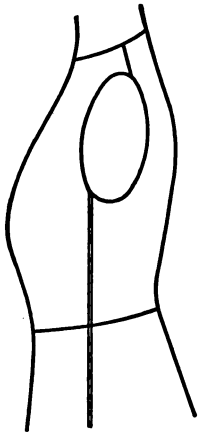
The shape of seam B is controlled by its position at the shoulder, at the fullest point of the bust, and at the waist line. For linings the most usual position for the top of this seam is the middle of the shoulder; on most outside garments, however, it will be found nearer the arm curve. The latter gives not only a more pleasing spacing at the shoulder seam, but it also increases the apparent width of the shoulders. The position at the fullest point of the bust is most easily discussed in relation to a perpendicular line which bisects one half of the chest line. This line can be shown on a person with a line of pins. Seam B may coincide with this line at the fullest point of the bust; it may be placed back of this line, or it may be placed slightly nearer the center front. When the width of the front piece at the waist line is wide, the position at the bust line is usually farther back than the line of pins; with a narrow width at the waist line, the width at the bust is usually narrowed. In fitting a tight fitting waist, it will be found, if seam B is placed nearer the front than the line of pins, that it will be necessary to hold in a little fullness over the bust in the side front piece when basting it to the center front piece.

If seam B is placed at the center of the shoulder,

curves out at the point of the bust and narrows in at the waist line, it will accent the curve or size of the bust, while a seam placed low on the shoulder, and slanting in a straight line to the waist will accent shoulder width rather than the size of the bust.



Two different positions for seam B and the relation of each to the center chest line.



Position of seam C.

FIG. 23.

The underarm seam or, where an underarm piece is used, the *front* underarm seam is the key line for all fitted or semifitted garments which extend below the waist. It should be drawn as a plumb line, for if it slants forward or backward at the top it will give the effect of throwing the body out of balance. This seam is usually placed at the front edge of the hollow underneath the arm. In order to place seam C in the drawing at the right point of the armhole, it is a good plan

to measure down from the shoulder on the arm curve to the top of the seam. In some systems, this line is placed by taking the measure of the distance between the center front seam and the highest points of seam C. The *slant of seam C* in the drawing of a tight fitting waist should be the same as the *slant of the underarm seam in a shirtwaist pattern for a corresponding bust measure.*

Seam D is placed usually about parallel to seam C just back of the hollow under the arm. The exact shape of the underarm piece defined by these two seams will vary somewhat with the relative size of the bust and waist. For slender figures with a normal waist size, the underarm piece is about the same width at the waist and bust, while with a large bust and small waist it may be made wider at the bust and narrower at the waist. At the arm curve an underarm piece is usually slightly narrower than at the bust line.

Seam E is placed most often so that it coincides at the shoulder with B. Its position at the waist line is governed by the size of the waist and the desirability of breaking the space across the back by a line which tapers in towards the center back as the figure narrows at the waist line.

Drafting a tight fitting waist pattern

A tight fitting pattern is made by modifying the shirtwaist pattern. The method of drawing used in the following discussion can be adapted to any system of drafting. Figure 24 illustrates a tight fitting pattern based on the 37″ shirtwaist pattern illustrated in Figure 19. Because of the closer lines required by the fitted pattern *a bust measure one inch smaller* has been used for the tight fitting pattern.

Additional measures needed for tight fitting waist.—*The width of pieces at the waist line.*—These measures are easily secured by the use of tapes as in Figure 22. Similar measures at the hip line are not essential as most drafting systems rely upon fitting for the accurate adjustment of the extension.

The width of back to seam "D."—This measure should be taken wherever an under body piece is used. It is taken on the back bust line.

Height of bust.—This measure is taken to the fullest point of the bust. It may be taken from the shoulder seam along seam B, from the neck on the center front to a point which is on a horizontal line with the fullest point of the bust, or from the center of the neck curve on a slanting line to the fullest part of the bust. The last is the method used in Figure 24.

A. *Tight Fitting Back*

If a shirtwaist pattern made of lining material is fitted into a tight lining, it will be found that in the back it will be necessary to take out fullness below the shoulder blades at the center back and in two darts at each side of the center. It will also be found that to secure a close fitting arm curve it is advisable to take a small dart in the back at about the middle of the shoulder seam. This dart should extend from the shoulder seam to the most prominent part of the shoulder blades. The amount of material that will be taken out in any of these darts will depend upon the characteristics of the figure for which the pattern is being made. For a round shouldered person, all of these darts will be deeper than for an erect person. For a person with a waist that is large in comparison with the bust measure, the darts at

the waist line will be less deep than for a person with a small waist.

A comparison of Figures 19 and 24 will show that the main difference in the drawings of the backs of the two patterns is in the allowance for or outlining of these three darts.

Problem I. Construction Lines.

The construction lines used in the back drafts of a tight fitting waist and a shirtwaist are similar with the exception of the waist construction line which in all systems must be drawn on the *slope* of the *actual waist line* for a tight fitting pattern.

In System A, this means the addition of an underarm construction line. By drawing the waist construction line from the length of waist on the center back to the bottom of the underarm construction line rather than perpendicular to the center back line, the actual slope of the waist line is secured.

Problem II. The Center Back Line.

In a tight fitting waist this is a shaped line, which follows the center back construction line to about the back bust line; from this point it slants in to the waist line. For average figures this slant is secured by measuring in on the waist construction line from the center back construction line ¾″ to 1″.

Problem III. Front Edge of Center Back Piece.

This is a straight line drawn from the shoulder seam to a point on the waist line which will make the center back piece the correct width at the waist. The position of this line at the shoulder should co-

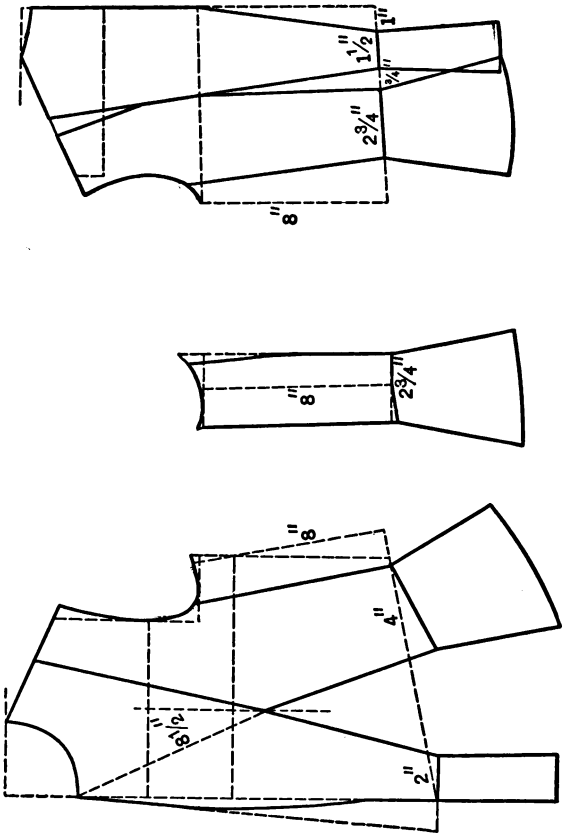


FIG. 24.—Tight fitting lining pattern.

incide with the similar seam in the front pattern which is usually at the middle of the shoulder length.

Problem IV. Back Edge of Side Back Piece.

This is a shaped line, the amount of slant depending upon the needs of the figure. For average figures ½″ to ¾″ taken in a dart at the shoulder and ¾″ to 1″ at the waist line is needed. Measure on the shoulder seam from the center back piece ½″ to ¾″ and draw a straight line from this point 4″ or 4½″ long running into the front edge of center back piece with which this line coincides as far as the back bust line. From this point a straight line is drawn to a point on the waist line ¾″ to 1″ from the center back piece.

Problem V. Drawing the Arm Curve.

In order to maintain the correct length of the shoulder seam, the shoulder line must be extended the amount that is taken out in the shoulder dart. The arm curve should be drawn so that the lower half will coincide with the arm curve of a shirtwaist pattern.

Problem VI. Front Edge of Side Back Piece.

This is a straight line drawn from the point on the waist line which marks the width at the waist of the side back piece, to the arm curve. The position of this line at the arm curve is controlled by the measure on the back bust line which marks the position of seam D.

Problem VII. Drawing the Extension below the Waist.

In most systems mechanical directions are usually given for drawing the seam lines which extend below the waist line, for example: place a ruler so that it coincides with the shoulder end of the neck curve and the waist end of the center back line and draw the center back extension at this slant. Such directions for drawing extension lines can be secured by placing a ruler along each extension line in Figure 24, and noting the points with which the ruler coincides. In the making of garments on princess lines, the slant of the extension lines defines the position of the skirt seams; because of this, it is most important that the degree of slant to be given to each extension line in a close fitting pattern should be carefully studied in several modeled and commercial patterns.

B. *Underarm Piece*

Problem I. Length and Width of Underarm Piece.

The underarm piece is based on a parallelogram drawn the width of the underbody piece at the waist and the length of the underarm seam.

Problem II. Back Edge of Underbody Piece.

It is obvious from the shape of the side back piece that this line should be longer than the center of the underbody. To secure this, the construction line should be extended until it is ½ inch longer than the front edge of the side back piece.

The back edge of the underbody piece is a shaped line which narrows the underbody piece at the top. The shape of this line is secured by measuring in about ¼″ on the top line of the parallelogram and drawing a slanting line from the arm curve through this point to a point about 1/3 of the distance down the back construction line, which is then followed as a straight line to the waist.

Problem III. Drawing the Arm Curve.

The arm curve is drawn from the end of the back construction line, touches the top of the parallelogram at the center, and curves slightly upward at the front edge of the underbody.

Problem IV. Front Edge of Underbody Piece.

This line coincides with the front side of the parallelogram. It is drawn from the arm curve and extends about ¼″ below the bottom of the parallelogram.

Problem V. Waist Curve and Extension.

The waist line is a curved line connecting the bottoms of the front and back lines of the pattern. The same methods of drawing the extension are used as in the back.

C. *Tight Fitting Front*

If the front of a shirt waist pattern is fitted to the figure as a tight fitting waist, it will be found that the main changes are in the shaping of the center front line and in taking out fullness in a large dart which extends from the fullest point of the bust to the waist line. Practically, no change needs to be made in the slant or shape

of the shoulder, arm curve and underarm seams. The front length measure is always shorter in a tight fitting waist than in a shirtwaist as this measure for the shirtwaist usually allows for some blouse.

Problem I. Construction Lines.

The construction lines are drawn in the same way as for a shirt waist pattern.

Additional Construction Lines.

Two additional construction lines are used in this pattern, and both are used to place the position of the fullest point of the bust. A vertical construction line drawn at the middle of the chest line and perpendicular to it corresponds to the line of pins described on page 70. The diagonal construction line places the distance from the neck to the bust point. In Figure 24 this point falls on the vertical construction line; on outside garments it is usually back of this line.

Problem II. The Center Front Line.

This is a shaped line which is drawn by following a construction line which corresponds to the center front line of the shirt waist until the bust line is reached, and then curving back to the center front construction line at the waist.

Problem III. Back Edge of Center Front Piece.

This is a shaped line. The upper part is drawn as a straight line from the middle of the shoulder to the point of the bust. The lower part is drawn from this point to the point which marks the width of this piece at the waist. The width of the front

piece at the waist line is measured on the *actual waist line* which is always perpendicular to the center front construction line at this place.

Problem IV. Back Edge of Side Front Piece.

This line is drawn from the arm curve to the waist construction line, and it is parallel to the actual underarm seam of a shirtwaist pattern. This means that the slant of this line will vary with the bust measure. Since an underbody is made up of a piece from the back and a piece from the front, the position of this line will depend upon the width of the underbody piece at the top and the amount of this width that is allowed for in the back at the bust line.

Problem V. Front Edge of Side Front Piece.

This is a shaped line which coincides with the back edge of the center front piece from the shoulder to the point of the bust. The lower part of this line must be drawn the *same length* as the lower part of the back edge of the front piece since these two lines are joined to form seam B. The slant of this line is regulated by the width of the front side piece at the waist.

Problem VI. Drawing the Extension.

The same method of drawing the extension is used as in the back. The most important extension line, and the one which is most often drawn inaccurately, is at the front of the side front piece. This line should allow only a little more spring over the hips than a straight extension of the line of the pattern above the waist.

If the lines of a commercial close fitting pattern are studied, it will be found that they are not so angular as the lines of the pattern in Figure 24. This is particularly true of the lines which form seam B, for in commercial patterns this seam curves out above and below the bust point so that the pattern is rounded not pointed over the bust. When a close fitting waist pattern has been drafted, each piece of the pattern should be cut out and used as the basis for a new pattern made of cloth or soft paper in which each line of the pattern is curved instead of being left angular. Straight lines are used in drafting because the overlapping of the curves in some of the seams would confuse the drawing.

3. Kimono Waist Patterns

The kimono waist, in which the waist and sleeve are made in one piece, is a modification of the shirtwaist pattern that is constantly being used especially for sheer fabrics. Kimono waist patterns are of two types, close fitting and loose. The close fitting kimono waist offers a more difficult fitting problem than a loose one since it is extremely difficult to secure a close line over the shoulder and under the arm, and at the same time allow enough material for freedom of movement of the arm. The loose kimono waist does not fit close up under the arm, and it allows for great freedom in motion for this reason. It is the type of kimono waist that reappears in some form season after season. The loose kimono waist is more satisfactory in thin, soft fabrics, as it is bulky in outline in heavier materials.

Close fitting kimono waists.—There are three problems to be considered in making a close fitting kimono waist. The first of these is the best position of the under-

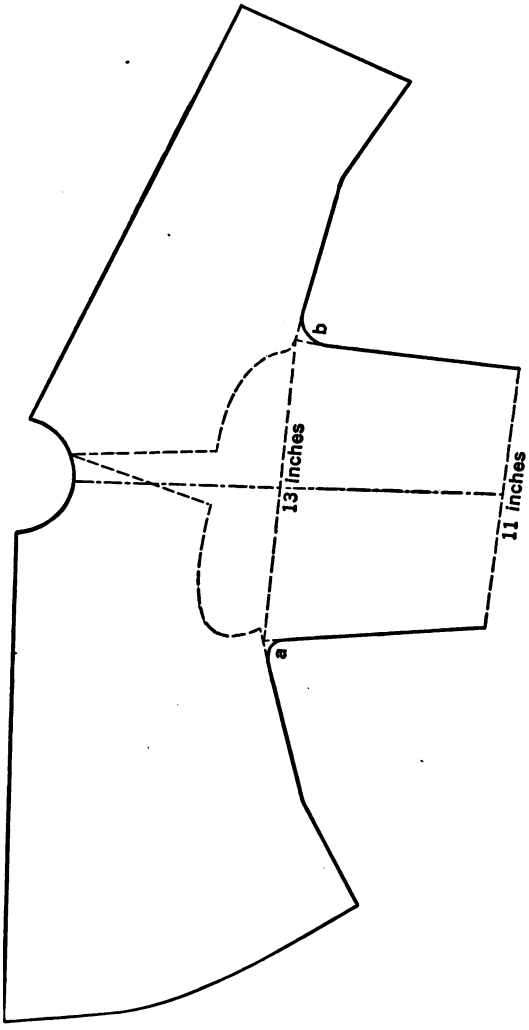


FIG. 25.—Close fitting kimono waist—Method 1.

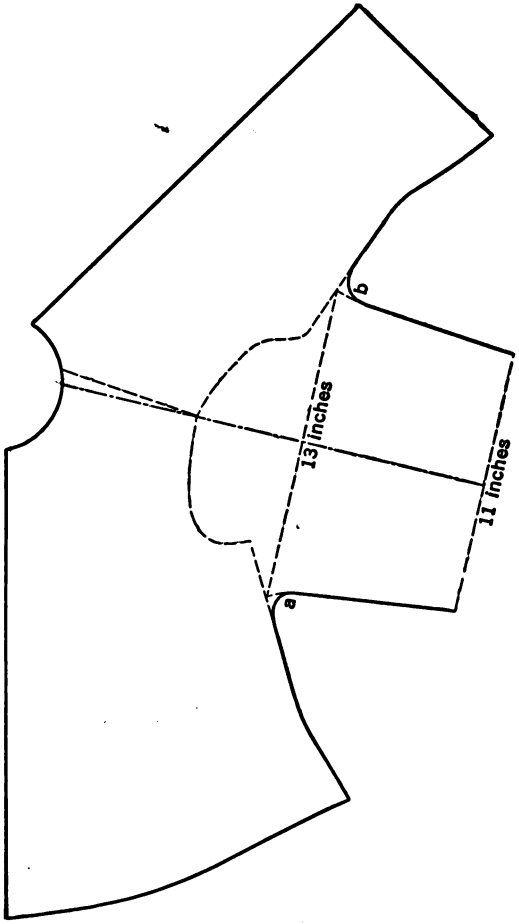


FIG. 26.—Close fitting kimono waist—Method 2.

arm seam, in order to place it so that it will not be strained when the arm is lifted. It can easily be seen by raising the arm that a seam which is placed over the prominent muscle at the back of the hollow underneath the arm will experience less pull when the arm is raised, than a seam placed directly under the arm or farther forward. The shirtwaist pattern which is to be used as the basis of a close fitting kimono should always have the underarm seam placed at the back of the hollow under the arm.

The second problem to be considered in making a close fitting pattern is to make the angle formed by the sleeve and the waist under the arm as wide as possible in order to allow the maximum amount of lift to the arm. Figure 25 illustrates a close fitting kimono waist pattern in which the maximum lift is secured, and Figure 26 illustrates a type which allows less. The large angle under the arm is secured by spreading the ends of the back and front shoulder seams apart. The farther apart the ends of the shoulders are placed the wider the angle under the arm but the looser the fit of the shoulder. In order to keep the normal length of the underarm seam as well as the larger angle under the arm, the front and back should be spread apart until the distance between the ends of the arm curve of the back and front is equal to the size around the arm. This gives a pattern which allows enough lift to the arm and still keeps a comparatively close fitting shoulder.

The third condition of a satisfactory kimono waist is that it should have similar angles under the arm for both back and front in order to have the same amount of strain on each side of the seam. This point is often ignored in kimono patterns and it usually results in the

splitting of the waist in the side that has the most strain. The simplest method of making similar angles under the arm is to cut the back and front underarm seams to within 2″ of the sleeve, and then fold the material at the shoulder so that the back and front underarm lines coincide; if the sleeve is now cut, the angles will be similar. The position for the fold for cutting the sleeve is shown in Figures 25, 26, and 28 by a dot and dash line. Its position varies with the amount of spread at the shoulder.

The arm measures used in the making of a close fitting kimono waist are the upper arm and elbow measures and the length from the neck curve to the elbow and to the wrist if a long sleeve is to be made. The upper arm measure is taken around the arm as far up as it can be taken. This measure is taken loosely and 1″ at least is added to this measure in the drawing in order to insure a comfortable sleeve. The elbow measure is taken around the elbow with the arm bent. The size of the pattern around the elbow should vary with the effect that is desired in the sleeve.

Modifications of close fitting kimono waist.—In order to give greater freedom of movement in waists made by Method 2, there are various devices used in commercial patterns. The gashing of the seam about 1″ in on a line which bisects the angle under the arm and the insertion of a square of material is a very common practice in the making of kimono waists. This patch is put in so that the straight sides are joined to the edges of the gashes and the diagonal and bias of the material is on a line with the seam. While the addition of such a patch relieves the strain on the angle of the seam it is quite a clumsy and difficult method to use.

The use of an extra piece in the form of a straight strip which forms a continuous underbody and under sleeve piece or a shorter piece used as either an underbody or an under sleeve are the methods of modification used in most commercial patterns. Since the under sleeve piece shows less on the garment than an underbody piece, it is more often used than the latter or than the continuous strip.

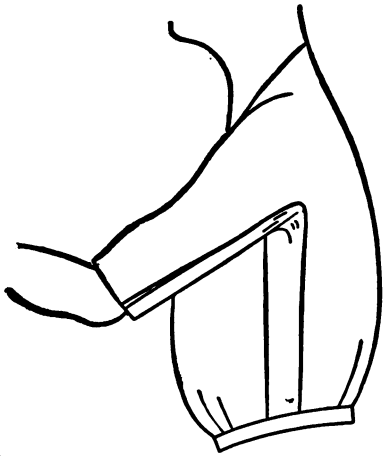


FIG. 27.—Kimono waist with underbody and underarm piece.

When a full length sleeve is used in a close fitting kimono waist, a more comfortable sleeve can be made by gashing the sleeve at the elbow on the back side and spreading the seam about 1½ inches. Figure 33 illustrates this method of modifying a sleeve pattern. The extra length in the back side of the sleeve should be gathered into a space of about 2 inches at the elbow. This will allow length for the bend of the elbow, and give the front side of the seam a slight curve which corresponds to the normal shape of the arm.

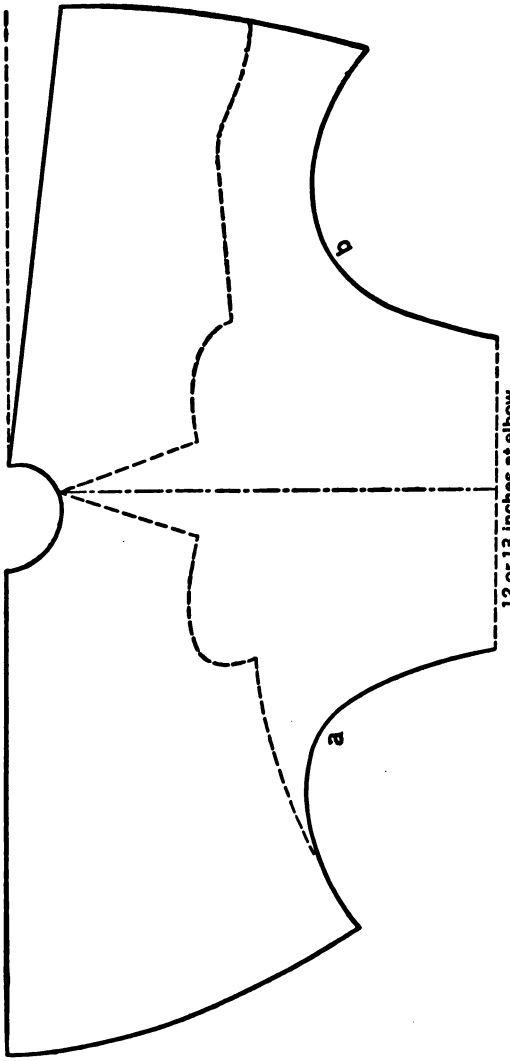


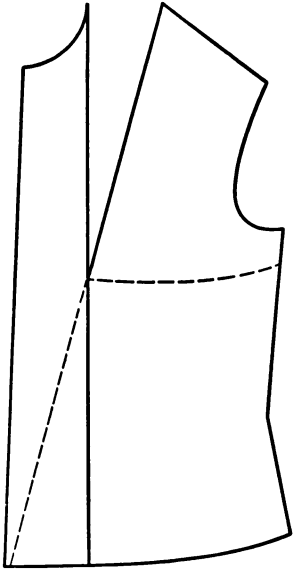
FIG. 28.—Loose fitting kimono waist.

Loose fitting kimono waists.—In a loose fitting kimono waist, the back and front of the pattern are practically the same except for the shape of the neck and the length of the center front and the center back. Also, in most cases, some of the fullness of the back is taken out by a slightly slanting center back line. This means that, actually, only the neck curve of the shirtwaist is used in cutting such a pattern and that the size around the elbow or at the wrist and the length from the neck curve to these points are the only important measures. In Figure 28 the pattern is drawn elbow length and 2 inches larger at the elbow than the elbow measure which is 11 inches.

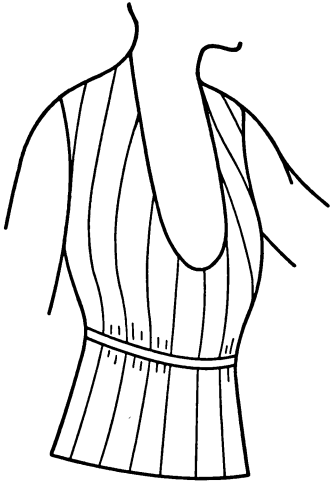
4. Semi-Fitting Waist Patterns

Under this term can be included all garments that are continued below the waist and that fit closely at the bust and hip lines but are not close fitting at the waist line. Many tailored coats and one piece dresses are made from patterns of this type. Most semi-fitting patterns are made by modeling or by the highly specialized drafting systems used by tailors, but it is possible to make from a shirtwaist pattern a few designs of this type which can be used for waists which are cut hip length and worn outside the skirt or for one piece dresses.

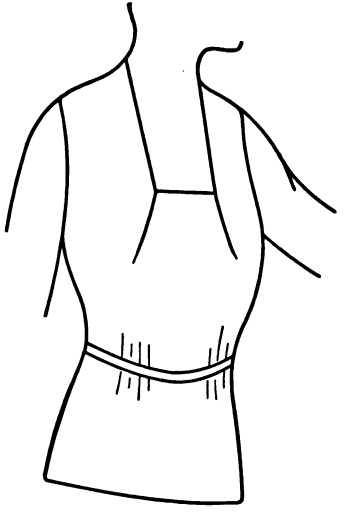
Figure 29 and the first drawing in Figure 30 illustrate the fronts of semi-fitting waists made from a shirtwaist pattern by gashing the pattern from the top to the bust line and from the hip to the bust line. The fullness at the hip is reduced by lapping the edges of the gash at the hip line. The extra fullness which is thrown into the upper part of the waist by the spreading of the material may be disposed of in various ways depending



Shirtwaist pattern gashed and size at hip line reduced.



Waist made in striped fabric to show bias line at shoulder and illustrating low cut neck.



Waist showing dart needed with a higher neck line.

FIG. 29.—Semi-fitting waists.

upon the position of the gash. The drawing in Figure 30 shows one method of disposing of this material when the gash is cut so that it runs into the shoulder seam. In place of the dart used here a few small tucks or gathers might be used. If the gash is cut from the highest point of the neck line and follows a straight vest line as in Figure 29, it is possible to make a waist of this type with an unbroken shoulder line.

The first of the two waists illustrated in Figure 29 shows the most marked characteristics of these patterns which is the bias line of the material at the shoulder. The neck opening of this waist is cut below the bust line which eliminates the necessity of taking out in darts the extra width of the pattern above the bust line which is essential with a higher neck opening.

For slender figures, it is possible to make a waist which

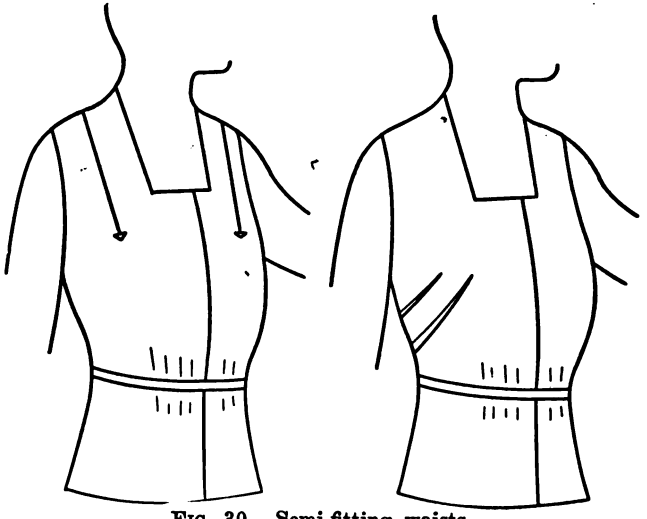


FIG. 30.—Semi-fitting waists.

will be close fitting at the hip line when only a single gash is made in the pattern; for full busted figures, it is impossible to make a close hip without using at least two gashes, one at the neck and one at the middle of the shoulder. Since this type of pattern is better adapted to an average or slender figure than to large figures, a two gash pattern has not been illustrated.

Experience in using gashing as a method of introducing or taking out fullness in a pattern will show many interesting effects in design that can be secured by this means, for it is possible not only to place gashes at any desired slant but also to change the direction of a gash so that a longitudinal gash may continue as a horizontal one, thus making it possible to use crosswise darts or folds rather than longitudinal darts in semi-fitting waists as in Figure 30.

EXERCISES FOR CHAPTER II

1. What conditions or characteristics of a figure will influence the amount which the gashes of the gashed corset cover can be spread at the top and lapped at the waist lines?
2. What would be the disadvantage of having the underarm seam of a chemise pattern more bias on one side than on the other?
3. What measures are necessary for making a kimono sleeve night gown pattern?
4. How would you place each of the seam lines in a tight fitting waist to decrease the eccentricities of a round shouldered, flat chested figure?
5. Why is the waist line in the center front piece of Figure 24 perpendicular to the center front line rather than on the slant of the waist construction line?
6. Explain why the dot and dash line in each of the three kimono waist patterns is in a different position.
7. How would you cut the gashes in a waist pattern to make a semi-fitting pattern for a waist which is to be high at the neck and has no dart at the shoulder, but which has darts or graduated folds extending across the waist from the underarm seam to the point of the bust?
8. Explain by a demonstration why the use of an underbody piece

or an underarm piece in a close fitting kimono waist will allow more freedom in the movement of the arm.

9. Work out the position of the seams and the measures at the waist line that could be used for a pattern for a princess slip.
10. Make an envelope chemise pattern which has straps over the shoulders rather than a fitted arm curve.

CHAPTER III

SLEEVE PATTERNS

THERE are two types of sleeve patterns, one piece and two piece. The two piece sleeve, because it can be fitted more satisfactorily to the outline of the arm, is used for the foundation or lining of many sleeves and for all tailored sleeves in cloth dresses, coats, etc. The one piece sleeve in its various modified forms is used for shirt waists, wash dresses, and for all fabrics for which a semi-fitting sleeve is desired.

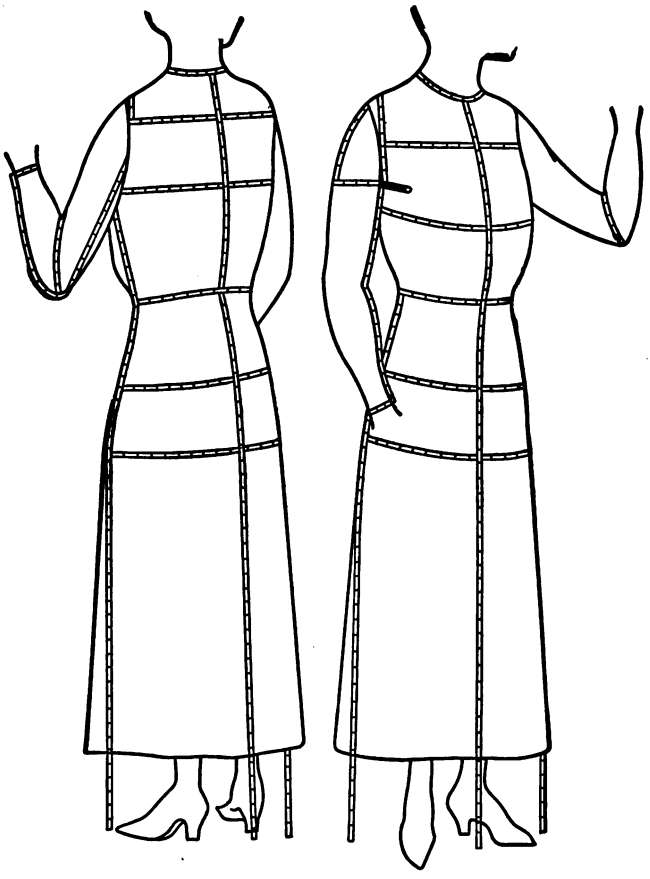
Measures used in drafting sleeve patterns.

1. *Upper Arm Measure.*

   This measure is taken around the arm on a line with the pencil position used in the waist measure. It is an easy measure and the tape measure should slip freely over the muscle of the upper arm when the arm is bent. For a very thin arm this measure should be taken quite loose.

2. *Elbow Measure.*

   This measure is taken around the elbow with the arm bent in order to secure a sleeve large enough at the elbow for all positions of the arm. For a large forearm, it is advisable to increase this measure if the size around the fullest part of the arm is greater than at the elbow itself.



Method of taking skirt and sleeve measures.
Method of taking waist measures for System A.

FIG. 31.

3. *Wrist Measure.*

This measure should be taken for sleeves that are to be made close fitting at the wrist. It should be made a little larger than the actual wrist measure.

4. *Hand Measure.*

The hand measure is used in place of the wrist measure for all sleeves that have no special opening at the wrist, or for shirtwaist sleeves. It is the smallest measure through which the hand will pass.

5. *Inside Length of Sleeve.*

These measures are taken from the muscle in front of the hollow under the arm along the inside of the arm on a line with the thumb from the arm curve to the elbow and from the arm curve to the wrist.

6. *Outside Length of Sleeve.*

Arm curve to elbow; arm curve to wrist. These are taken along the back of the arm over the bent elbow to the wrist from a point on the arm curve about 2″ above the joining of the arm to the body.

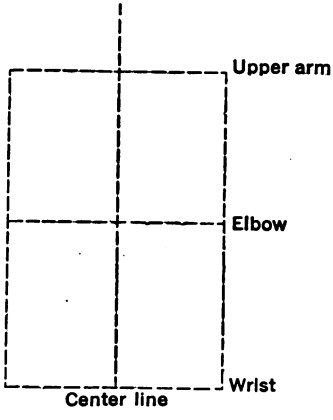
7. *Upper Arm to Highest Point of Sleeve.*

This is taken from the upper arm line to the highest point of the sleeve. It is measured perpendicular to the upper arm line, and its length will depend upon whether the seam at the top of the sleeve is to be placed at the end of the shoulder or higher upon the shoulder when a narrow shoulder effect is desired.

ARM MEASURES FOR A MEDIUM SIZE PERSON

	in.
Upper arm	12
Elbow	11
Wrist	7
Hand	8
Inside length to elbow	8½
" " " wrist	18
Outside " " elbow	13
" " " wrist	23
Upper arm to highest point of sleeve	4¾

Basis of sleeve drafts.—Sleeve patterns can be drawn opened out so that the upper and under parts of the sleeve are seen side by side, or they can be drawn with the paper or cloth folded through the center and the drawing of the under side superimposed upon the drawing of the upper side of the pattern. The first of these two methods not only offers the best conditions for the explanation of the drawing of the lines of the pattern, but it, also, shows more easily the effect of variations in measurements that may be used to produce a different outline to the finished sleeve.



Construction lines used in sleeve drafts.

FIG. 32.

The construction lines on which the drawing of a sleeve pattern is based are illustrated in Figure 32. These lines are all drawn parallel or perpendicular to the upper arm line. The length of the upper arm line varies with the size of the upper arm measure and the amount of fullness that

the style of the sleeve demands. The distance between the upper arm and elbow and wrist lines is controlled by the inside length measures of the sleeve and the amount that the center line extends above the upper arm line varies with the type of the sleeve. These construction lines are used for both one piece and two piece sleeve patterns.

1. Shirt Sleeves

A. *Standard Shirt Sleeve.*

The standard shirt sleeve is easy fitting and hangs straight on the arm with the seam in the position in which the inside length measure was taken. This means that the seam will not coincide with the underarm seam of the waist. The most marked characteristic of this sleeve is that the curve of the top of the sleeve is high enough so that when the pattern is tried on, the upper arm line will remain in the position in which this measure was taken. As a result, the standard shirt sleeve usually has a few gathers at the armhole, and the amount of this fullness will vary with the size of the sleeve. Figure 33 illustrates the narrowest shirt sleeve that it is advisable to make. This type of one piece sleeve is selected as a standard pattern because the conditions which control the length and the position of each line can be easily demonstrated and also because the shape above the upper arm line and the position of the inside seam is the same as for the two piece sleeve pattern.

I. Shape of the sleeve above the upper arm line.— The shape of a sleeve above the upper arm line is one of the most important problems in sleeve designing, for in a large sleeve the shape of the top curve will control

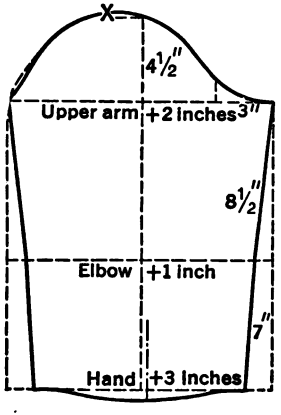
the outline of the sleeve at the shoulder, and, in a small sleeve, it is essential to secure the correct shape for both comfort and outline. In a standard shirt sleeve pattern the difference between the shape of the upper side of the sleeve and the under side of the sleeve is clearly seen. Though this difference is much less evident in the other two shirt sleeve patterns shown in Figure 33 the method of drawing the upper and under sides of the curve is similar in each case.

Problem I. Height of Arm Curve above Upper Arm Line.

In the standard sleeve, the highest point in the arm curve must be placed in the drawing so that its distance from the upper arm line is the same or greater than the measure from the upper arm to the highest point of the sleeve. For close fitting sleeves or those with a small amount of fullness, the actual measure should be used but as the size around the sleeve increases the height is, also, usually increased to make the sleeve stand out farther from the arm. The position on the pattern of the highest point of the sleeve can be easily seen if a one piece sleeve is creased in the center and the seam placed in the same position as the seam of the standard sleeve. It will be found that the center of the sleeve which corresponds to the center line of the drawing lies about 1″ or 1½″ back of the highest point of the sleeve depending upon the size of the sleeve.

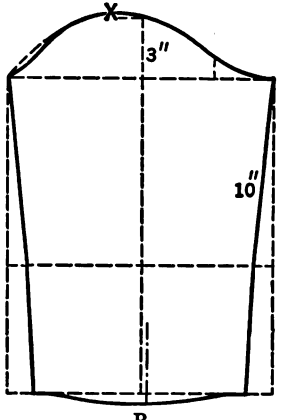
To Place the Highest Point of the Sleeve in the Draft.

For a standard sleeve, extend the center construction line above the upper arm line ¼″ less than



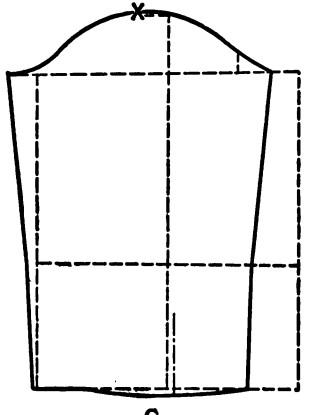
A

Standard shirt waist sleeve allowing 2½ inch cuff. No seams allowed. X = top of shoulder. Dot and dash line shows position of placket.



B

Shirt waist sleeve without fullness at top. Length to elbow increased. 2½ inch cuff as in A.



C

Same sleeve with seam placed farther under the arm.

FIG. 33.—Shirt sleeves.

the actual measure. The highest point is 1½″ on the upper side of the pattern and ¼″ above the end of the construction line.

Problem II. Shape of Front Arm Curve.

The arm curve for the upper half of the sleeve is based on a continuous curve drawn from the end of the upper arm line through the highest point of the arm curve to the end of the center line. The intensity of this curve will vary with the amount of fullness in the top of the sleeve. Most drafting systems use some mechanical means for drawing this curve, such as a curved ruler or the selection of a pivot point from which the curve can be drawn with a compass or a string. As in the drawing of all curves required in pattern making, the most satisfactory method is to study the character of the curves in various patterns before attempting to make the drawing. A piece of soft paper modeled over the arm as a sleeve, on which the position of the arm curve is drawn is another method of studying the character of this curve. The slight inward curve extending up about 2″ on the lower end of this curve as seen in Figures 33 and 34 is necessary to make a continuous curve when the seam of the sleeve is sewed together.

Problem III. Shape of the Arm Curve at the Back and under the Arm.

When the seam of the sleeve is placed at the front of the hollow under the arm, the curve of the sleeve under the arm will be drawn on the under half of the sleeve pattern. If a ruler is placed under the

arm, it will be found that about 3″ of the arm curve is under the arm; with a large arm this measure usually will be 3½″. In order to allow for the forward movement of the arm, the curve under the arm should be *one inch higher* at the back than at its front end.

To draw the under side of all sleeve patterns, measure on the upper arm line from the inside seam construction line 3 inches or 3½ inches, and, at this point, measure above the upper arm line 1 inch. Continue the curve of the upper side of the sleeve from the end of the center line with an outward curve to this last found point, and, from here, draw an inward curve to the seam. This last curve coincides with the upper arm construction line for about one and a half inches.

II. **Shape of the seam of the sleeve.**—In a standard shirt sleeve, the distance between the upper arm construction line and the elbow construction line is the same as the actual measure from the arm curve to the elbow on the inside seam. The wrist construction line is placed by the similar measure from the arm curve to the wrist but for a shirt sleeve pattern the width of the cuff should be subtracted from the length in order to make the finished seam the right length.

A shirt sleeve is characterized by the fact that if the sleeve is creased in the middle the sides of the sleeve will coincide in shape. This makes the sleeve lie perfectly flat when it is folded, which is desirable in ironing. To secure this result, the width at the elbow and at the hand should be equally divided on each side of the center line in the drawing. Though the width at the

elbow may be larger if a full sleeve is desired, the addition of 1″ to the elbow measure makes a most satisfactory sleeve. The width of a one piece sleeve at the wrist line is always influenced by the elbow width. If a ruler is placed at the top and bottom of the seam in any of the sleeve patterns in Figure 33, it will be seen that the slant of the upper and the lower lines of the seam creates a slight inward curve at the elbow. This is usually seen in all shirt sleeves though if less fullness is desired at the wrist, the line drawn from the end of the upper arm line to the elbow may be continued as a straight line to the wrist.

To draw this seam, a straight line should be drawn from the end of the upper arm line to the point on the elbow line. The width at the hand should be decided by placing a ruler so that it coincides with the top of this line, and lies about ¼″ or ½″ beyond the bottom of the line at the elbow; the point where the ruler crosses the wrist line gives the width at the hand. This point should be connected with the width at the elbow by a straight line.

III. Shape of the bottom of sleeve.—The bottom of a shirt sleeve should curve down below the wrist line at the center of the sleeve. The amount which this line curves down will vary with the size of the sleeve at the wrist and with whether or not it is desirable to have the sleeve stand out a little over the cuff. A plain straight line shirt sleeve requires an extension of the center line of ½″ to 1″ depending upon the size of the sleeve around the wrist; in the small sleeves of Figure 33 ½″ is allowed, but this should be increased ⅛″ for each additional inch in width in a larger shirt sleeve.

In drawing the bottom of the sleeve, the line should

follow the wrist construction line for about 1½" from the seam, curving down to the end of the extension of the center line and curving back again to the wrist line about the same distance from the seam.

The position of the gash for the placket of the sleeve will depend upon where the fullness is to be placed. Some shirt sleeves have all the gathers in the under side of the sleeve; some have gathers in the upper side only; while in others the fullness is equally divided. A gash that is made about one half inch from the center line on the under side will place the placket in the right position if a few gathers are used in both the upper and under sides.

B. *Modified Shirt Sleeve*

Many shirt sleeves differ from the standard sleeve in having no fullness at the armhole, and in having the seam of the sleeve placed so that it will coincide with the underarm seam of the waist. Drawing B and C in Figure 33 illustrate the methods by which these results are secured.

Eliminating gathers from the top of a sleeve.—The gathers can be eliminated from the top of a sleeve by lowering the extension above the upper arm line. By this method, it is possible to reduce the size around the arm curve without changing the width around the upper arm. The effect of this modification in the shape of the sleeve above the upper arm line is seen at two points: the weft threads of the fabric from which the sleeve is made will not lie in the position of the upper arm line but will curve upward at the top of the arm, and the sleeve will hang in folds along the inside seam from the arm curve to the elbow. The first of these is merely

a characteristic of the sleeve while the second point must be carefully noted in the making of these patterns.

A measurement of 3″ above the upper arm line as used in Figure 33 is a good average height for a sleeve of this type. This means that the height of the sleeve has been reduced 1½″ which must be compensated for by *increasing the inside length to the elbow an equal amount.* The method of drawing the arm curve of this sleeve is the same as for the standard shirt sleeve.

Changing the position of the seam.—Since the under-arm curve of the sleeve coincides for about 1½″ with the upper arm line it is a very simple problem to change the drawing of a sleeve so that this space is drawn on the upper side of the sleeve rather than the under side. In order to keep the same shape at the arm curve and hand, the same construction lines should be used and the top and bottom curves should be drawn as for a pattern with the seam placed farther forward. The only change consists of drawing on the upper side the straight strip that is cut off of the under side of the sleeve which means a change in the position but not the shape of the side lines of the pattern.

2. Two Piece Sleeve

A two piece sleeve can be made somewhat closer fitting at the upper arm line and at the elbow than a shirt sleeve. Figure 34 illustrates a standard pattern which is 1½″ larger than the upper arm measure and at the elbow is the same as the elbow measure. The reason that it is possible to use this small elbow measure is that the shape of the sleeve conforms more nearly to the actual shape of the arm than the straighter shirt sleeve. The two piece sleeve is similar to the standard

shirt sleeve in having the inside seam placed in the same position at the arm curve, in placing the elbow and wrist construction lines by the actual measure of the inside length, and in using the actual measure above the upper arm line for the height of the top of the sleeve.

Problem I. Shape of the Top of the Sleeve.

The top of this sleeve is drawn by the same method as the top of the standard shirt sleeve.

Problem II. Drawing the Inside Seam of the Upper Piece.

If, with the arm hanging in an easy and natural position at the side, a ruler is placed so that it touches the point on the arm curve where the top of this seam should be and at the same time the base of the thumb, it will be found that the elbow curves away from the ruler about 1½". Since the two piece sleeve fits closely to the arm the slant of this seam is secured by measuring in from the construction line on the elbow line 1½". The top and bottom of the construction line are connected by straight lines with this point.

Problem III. Drawing the Inside Seam of the Under Piece.

This line on the under piece is made with a less acute angle at the elbow than in the upper piece, in all two piece patterns. The reason for this is easily seen, for, if these two lines are seamed together, it will be found that the upper part of the sleeve rounds out and does not lie flat as does a shirt sleeve which uses similar angles at the elbow. This in-

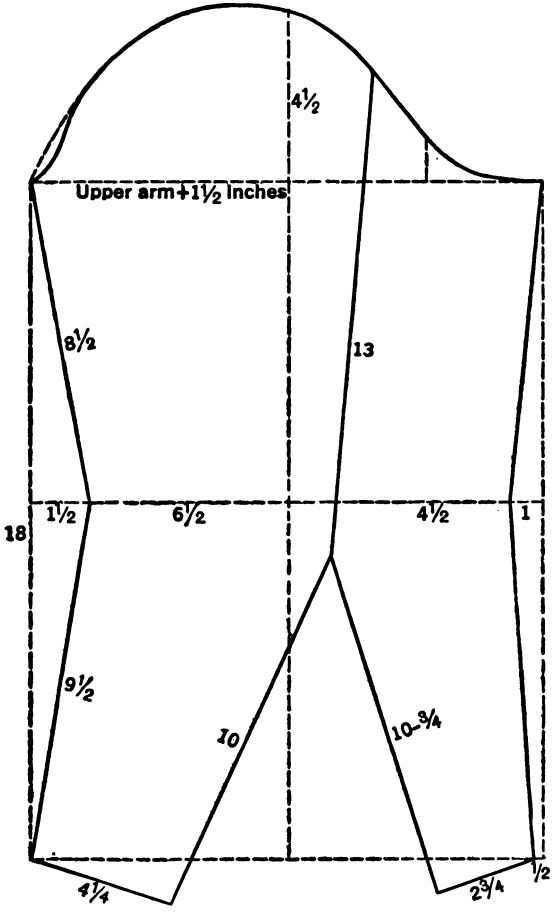


FIG. 34.—Two piece sleeve.

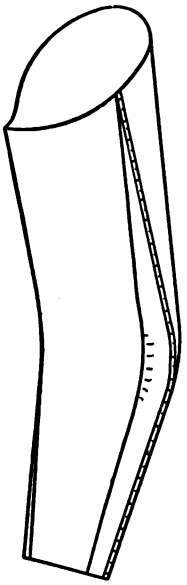
creases the conformity of the sleeve to the shape of the arm.

In most patterns the curve at the elbow of this seam is about one-half as deep in the under piece as in the upper piece. To secure this in the drawing, the width of the sleeve at the elbow should be marked on the elbow line, and the point in the wrist line which represents the bottom of this seam should be so placed that a ruler laid from the top of the seam to this point would be ¾″ beyond the width at the elbow.

Problem IV. Drawing the Outside Seam.

The lines of the outside seam for the upper and under pieces coincide from the arm curve to the elbow. The position of this seam at the arm curve should correspond to the point from which the outside length measure was taken. This point on the drawing is about 2″ up on the arm curve from the top of the short construction line which marks the back end of the curve under the arm. The position of this seam at the elbow is not over the point of the elbow as the measure is taken but a little more on the inside of the arm. This will make the upper piece about 2″ broader at the elbow line than the under piece. The line which represents this seam in the drawing should be extended below the elbow line until it equals the outside length measure from the arm curve to the elbow. Below the elbow, the slant of the lines of this seam is governed by the size of the wrist measure and the amount of this measure which is apportioned to the upper and under pieces of the sleeve. The size of

these two parts of the pattern at the wrist can easily be found by actual measure if the best position of this seam on the arm is decided upon. In Figure 34 the top piece is made 1½″ broader than the under piece at the wrist.



Two piece sleeve sewed together showing position of outside seam and outside length measures.

FIG. 35.

The length of the outside line of the upper piece should equal the outside length measure of the sleeve. The length of the outside line of the under piece, however, should be about ¾″ shorter since the seam itself will be shorter than the outside length measure of the arm as is seen in Figure 35. The extra length of the upper part of the pattern should be held in by a few gathers at the elbow. In some two piece sleeve patterns, however, the seam of the sleeve is placed so that it practically coincides with the position of the outside length measure; in this case, the length of the lower part of the seam should be the same for both the upper and under sides of the pattern.

Problem V. Drawing the Bottom of the Sleeve.

The bottom lines of both the upper and under pieces of the pattern are straight lines drawn from the ends of the lines of the inside and outside seams.

Problem VI. Curving the Lines of the Seams.

Though the inside and outside seams are drawn as straight lines in the draft, these lines should be curved when the pattern or the sleeve is cut out of material. The shape of each piece in a well fitting sleeve pattern should be studied to see the character of the curve which should be used for each line. The most important points are the curving out of the sleeve above and below the sharp point of the elbow. The curved lines should not reduce the size of the pattern at any point but they may give additional width especially over the large muscle of the fore-arm.

3. Various Types of One Piece Sleeves

One piece sleeve patterns can be used for sleeves of a great variety of shapes. These patterns may be divided into three general types: those for sleeves which are close fitting from the arm curve to the wrist; those that are small at the arm curve and large at the wrist; and those that are close fitting at the wrist and elbow and large at the top.

Position of seam, height of curve and shape of seam. —One piece sleeves may be made with the seam of the sleeve placed as in the standard shirt sleeve, at the position in which the inside length measure is taken, or it may be placed farther under the arm. This latter position of the seam is very often used with close fitting sleeves for the seam is much less conspicuous when it is placed under the arm. In the sleeves illustrated in Figure 37 this position of the seam has been used.

The elimination of gathers from the top of small

sleeves by reducing the height of the sleeve above the upper arm line can be used in all one piece patterns, as in the shirt sleeve pattern, on condition that the length of the sleeve from the upper arm line to the elbow is increased in proportion to the amount taken from the normal height of the sleeve.

The curve of the line of the seam of the sleeve at the elbow is usually the same for both the upper and under sides in a one piece sleeve, though for non-washable fabrics the under side of the sleeve may have less curve as in the two piece sleeve pattern.

In order to emphasize the fundamental differences in each type of one piece sleeve patterns, the following drawings with the exception of those in Figure 37 are made with the normal height above the upper arm line, with the standard position of the seam, and with similar curves at the elbow for the seam lines.

Type 1.—Close Fitting Sleeves

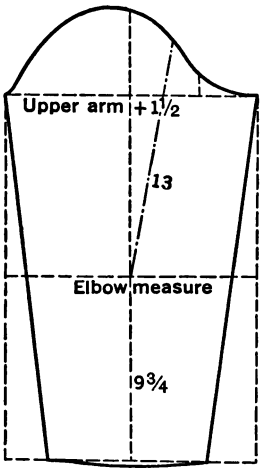
The one piece sleeve fitting closely from the arm curve to the wrist is a sleeve very commonly used, but, one which must be very carefully planned in order to make a comfortable sleeve, for a sleeve which fits closely to the arm must have enough length along the outside line of the sleeve to allow for the bend of the elbow. There are three different methods that can be used to secure this length in one piece sleeves: (A) to place the elbow and wrist construction lines by the outside length measures; (B) to make the seam curve the same as the normal curve of the arm and take out the extra fullness at the wrist with a dart or seam to the elbow; (C) to add extra length to the sleeve by gashing and spreading the under side of the pattern. The drawings in Figure 36 show the

characteristics of the patterns drafted by each of these methods and Figure 37 illustrates the appearance of the finished sleeve made by each method.

Method A.—This method of making a close fitting one piece sleeve is used very generally for patterns for wash fabrics. Since the elbow and wrist construction lines are placed by the back length measure, the seam of the sleeve will be longer than the actual measure of the arm at the place where the seam lies. This extra length of the seam is creased in folds at the elbow when the arm is bent or it may be confined by small tucks extending across the inside of the arm at the elbow. The seam line of this pattern is drawn as a straight line from the arm curve to the wrist, and the slant of the line is controlled by the width at the elbow. This means that the size of the pattern around the wrist is controlled by the width of the elbow measure.

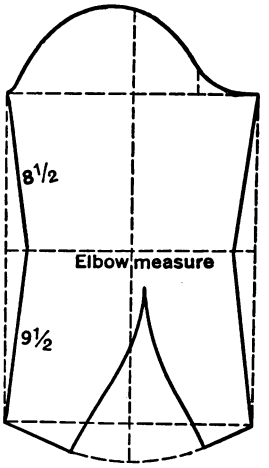
To secure the correct relation between the seam and the bottom of the sleeve, the bottom of the pattern should be curved down a little below the wrist construction line. In order to make the sleeve small enough at the wrist, the seam will probably need to be fitted in a little at the bottom and a small dart may be taken on the under side of the sleeve. These modifications should be made by fitting rather than in the pattern.

Method B.—This is the most comfortable type of close fitting one piece sleeve since the line of the seam corresponds to the normal shape of the arm. This curving of the seam, however, produces a sleeve which is so large at the wrist line that it is necessary to use a seam from the wrist to the elbow to eliminate the extra material. This draft is practically the same as the draft for the two piece sleeve with the exceptions of having



A

Outside length measure used for construction lines.



B

Inside seam has curve of arm. Dart to elbow.

C

Gashed sleeve 1½ inches added to length of under side by the gash.

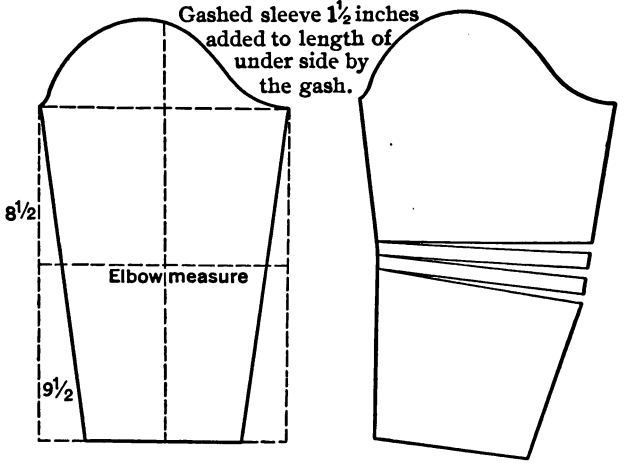


FIG. 36.—Close fitting one piece sleeves.

equal angles at the elbow for both the upper and under sides of the seam and of having no allowance for fullness at the elbow. A two piece sleeve pattern may be used for such a sleeve.

Method C.—This pattern is used for fabrics of all type, though, because of the fullness on only one side of the seam, it is more difficult to iron than a flat sleeve. This sleeve is always more satisfactory when the seam is placed under the arm as this brings the line of the

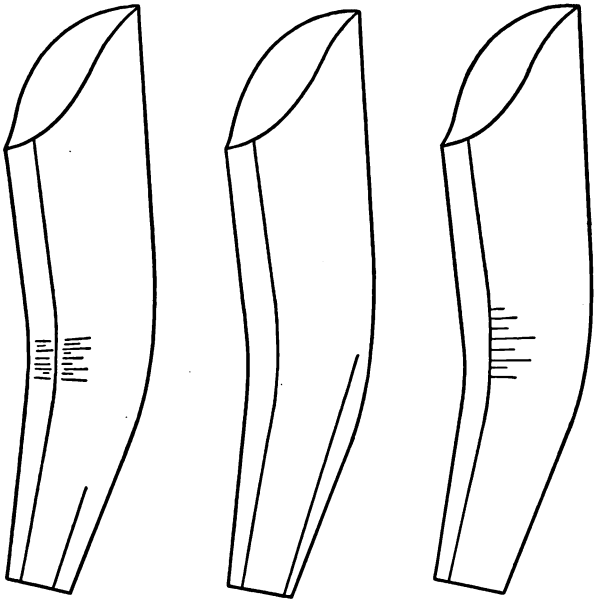

A
B
C
Size at wrist secured by fitting at seam and small dart.
Wrist size secured by large dart.
Wrist size secured by fitting at seam.

FIG. 37.—Close fitting sleeves with seam placed under the arm.

gathers nearer the prominent bone of the elbow. A straight line should be used for the bottom of the sleeve in the foundation pattern as the extra length given to the pattern by gashing will give the downward slope which is necessary for the back of the wrist, and straight lines should be used for the lines of the seam since the curve of the seam is also secured by the gashing. The gashes should be made at the elbow line and a little above and below, and the pattern should be spread enough so that the extra length will give freedom in the movements of the arm. It is difficult to use more than 1½″ in additional length in the seam. In many sleeves, this extra material is put in a single dart rather than as gathers. This is the most satisfactory sleeve to use for a full length close fitting kimono sleeve.

Type 2.—Sleeves Small at the Top and Large at the Wrist

Though the full length sleeve built on these lines has usually only a temporary vogue in costume designing, loose flowing sleeves of all types are based on a similar plan, and it is desirable to understand the principles which control the making of these patterns. Since the most characteristic feature of these sleeves is the loose baggy outline of the sleeve below the elbow, the points to be noted in making patterns for such sleeves are the conditions which regulate the width at the wrist line and the amount which the bottom of these sleeves may curve down below the wrist line.

Width at wrist line.—The width at the wrist line of patterns of this type is controlled primarily by the size at the elbow. The reason for this can be seen in Figure

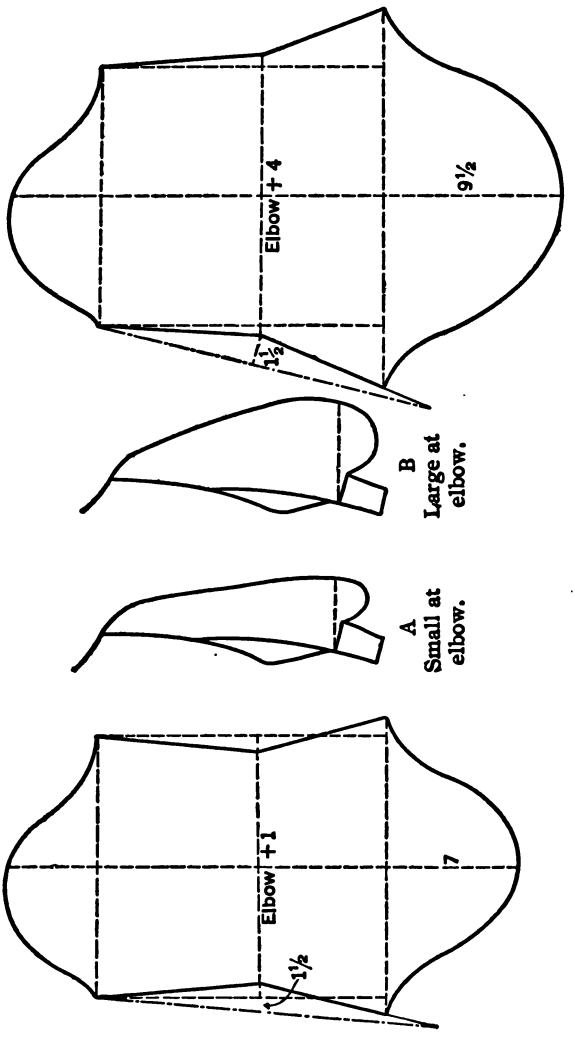


FIG. 38.—One piece sleeves large at the wrist.

38 which illustrates the maximum width at the bottom of a sleeve which is close fitting at the elbow and one which is larger at the elbow line. Any sleeve which is made with the line of the seam having a greater curve than the natural curve of the arm will not only hang badly on the arm but it is liable to tear in the seam at the elbow whenever the arm is straightened out in reaching for something.

In the draft of the two piece sleeve, the normal curve of the arm was reproduced in the drawing by placing the elbow curve 1½″ back of a straight line which connected the end of the arm curve and the end of the wrist; this same method is used in Figure 38. The slant of the dot and dash construction line which defines the width at the wrist is secured by measuring out from the width of the elbow 1½″ and drawing the line from the end of the arm curve through this point. This dot and dash line should be made the length of the inside seam measure. The wrist line of the drawings in Figure 38 is not placed at the actual position of the wrist as allowance is made for the 3″ cuff shown in the smaller figures.

Depth of bottom.—The amount that the bottom of the sleeve curves down below the wrist will depend upon the width of the sleeve at the wrist line and the amount of bagginess which is desired. If a tape line is used to show on the arm the outline that is desired in the sleeve the amount of the extension below the wrist line can be measured exactly. It is most important in drawing the curve for the bottom of the sleeve to have the line of the part of the sleeve which does not bag in the same relation to the seam of the sleeve as the bottom line of a more normal sleeve pattern.

Type 3.—Sleeve Close at Wrist and Elbow and Large at Top

As in Type 2, the width at the elbow line is a decisive factor in the width of the sleeve, but, in this case, the variation is in the width at the upper arm line. The method of drawing this pattern is the reverse of the method of drawing all other sleeve patterns, as the top of the sleeve is not drawn until the bottom is completed. The position of the wrist, elbow, and upper arm construction lines is measured on the center line, the inside length measures being used. The seam lines for the lower part of the arm are then drawn using a measure a little larger than the wrist measure on the wrist line, and at the elbow, the elbow measure. If the exact wrist measure is used, there is danger that the sleeve will be too small over the muscle of the fore arm. The width of this pattern at the upper arm line is formed by the same method that was used to place the width at the wrist in sleeves of Type 2. The dot and dash construction line is placed 1½″ beyond the elbow width, and the line is drawn from the wrist line through this point, and defines the width of the upper arm construction line.

The curve of the top of this pattern illustrates three principles:—

1. As the size of the sleeve at the top increases, the height above the upper arm line increases.
2. As the height and width of the sleeve increases the intensity of the curve increases.
3. As the slant of the upper part of the seam of the sleeve increases the construction line which outlines the shape of the curve under the arm must be lengthened since the curve under the arm and the

seam of the sleeve must always be in the same relation to each other.

The height of the center line above the upper arm line will vary with the outline that is desired; in general

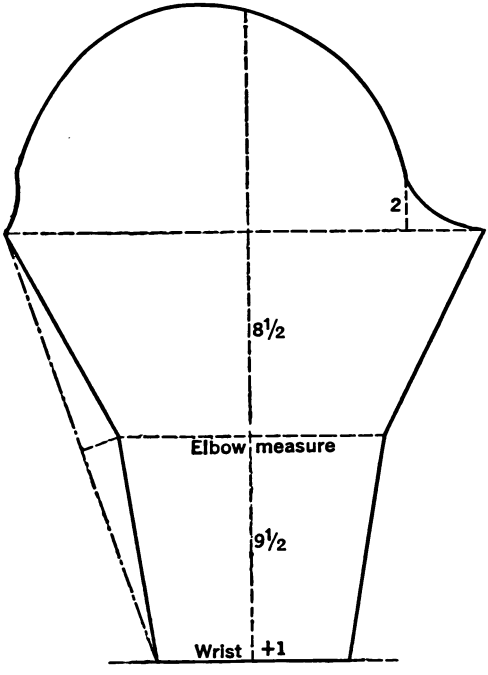


FIG. 39.—One piece sleeve large at the top.

terms the distance above the upper arm line about equals the amount of fullness added at the upper arm line. The wrist line of this pattern should be left as a straight line as the change in the method of drawing the curve under the arm increases the length from the arm curve to the wrist at the back of the arm.

EXERCISES FOR CHAPTER III

1. In changing the position of the seam in a one piece sleeve so that it will coincide with the underarm seam of the waist is it ever advisable to move the sleeve seam more than 1½" back or should the underarm seam always be moved forward to meet the sleeve at this point?
2. What changes in the drawing of a two piece sleeve would be necessary if no fullness at the elbow of the outside seam is desired?
3. Explain why the wrist line of the two piece sleeve drops so much farther below the wrist construction line than in the plain shirt sleeve pattern.
4. Under what conditions should the outside length measures rather than the inside length measures be used to place the position of the elbow and wrist construction lines in drafting a sleeve pattern.
5. Explain why the hand measure rather than the wrist measure is used as a basis for measurement on the wrist construction line.
6. Is it possible to make a sleeve that has great width at the upper arm line without adding proportional length above this line? Illustrate the effect that would be produced.
7. At what points on the top curve of a full sleeve should the gathers start at the back and at the front?
8. Where should the placket gash be placed in a shirt sleeve which is made with all the fullness on the upper side of the sleeve?
9. In what types of sleeves can the exact elbow measure be used without adding any extra fullness and still make a comfortable sleeve?
10. Draft a kimono waist pattern with a full length gashed sleeve.
11. Enumerate all the factors which influence the height of sleeves above the upper arm line.

CHAPTER IV

SKIRT PATTERNS AND PATTERNS BASED ON SKIRTS

1. Principles of Skirt Drafting

Both the skirts of dresses and separate skirts show such a wide variation in design from year to year that any system of drafting which cannot readily respond to changes in the outline of a skirt has little value in school work. The factor which influences the outline of a skirt most is the size around the bottom. The size around the hips and the length are secondary factors, though extreme shortness or extreme width across the hips may seem to have been the most marked characteristic of skirts at different times. While great variety can be given to the outline of a skirt by extraneous trimmings or draperies, the outlines or silhouettes which can be secured in the basic pattern is the problem to be analyzed in drafting a skirt pattern.

Skirt patterns may be divided into two groups: those that are made in one piece, and those that are divided into gores. The cutting of a skirt into gores or lengthwise sections presents so many opportunities for modifying the design of a skirt that a study of the principles which underlie the making of a one piece skirt should be the first step in the study of skirt patterns. Not only is the one piece skirt a basic problem, but in most drafting systems, the drawing of a one piece skirt is a pre-

liminary step and the gored pattern is secured by dividing this skirt into the desired number of gores. A few drafting systems have worked out elaborate methods of drawing separately the pattern for each gore of a gored skirt, but the extreme difficulty of making the patterns drawn by this method respond to changes in the shape of skirts demonstrated its inadequacy unless used by experienced designers.

Taking as a standard or normal skirt a one piece skirt which fits closely without darts at the waist and at a hip line at least 6 inches below the waist, there are two classes of skirt patterns, those that are larger around the bottom than the normal skirt and those that are smaller around the bottom. A one piece skirt which is *larger than the normal* is characterized by *a more intense curve at the waist line and by a hip size which is larger than the hip measure.* A one piece skirt which is *smaller than the normal* shows *a less intense curve at the waist line and a waist size larger than the actual waist measure;* when such a skirt becomes excessively narrow around the bottom, the size around the hips must also be increased to allow enough room for freedom of movement.

Since a normal skirt is one which fits without darts or fullness at the waist and hip lines, its size around the bottom will vary with the length of the skirt and with the relative size of the hips and waist of the person for whom the pattern is to be made. For a person with a large waist and small hips, such a skirt will be much narrower than for a person with small waist and large hips. Figure 40 shows patterns for these three types of skirts made for a particular person, and illustrates the change in the curve of the waist for skirts of different

sizes and the increased waist and hip size needed respectively for narrow and wide skirts.

Methods of drafting one piece skirts.—To secure the proper curve at the waist line for skirts of different widths around the bottom is the fundamental problem in skirt drafting. The hang of the skirt depends upon the character of this curve, and, also, it is quite obvious that unless the waist curve becomes more intense as the size of the skirt increases the center back of the pattern will not remain perpendicular to the waist curve which is the correct relation of these two lines. There have been various methods worked out in different drafting systems by which a satisfactory waist curve can be secured. Some of these require special directions for each style of skirt that is drafted, while others are adapted to the making of skirts of all sizes. Of the latter group, the three most used methods are the geometrical method, the waist curve drawn on a parallelogram and the gashed pattern. These three methods are illustrated in Figures 41 and 43.

A. *Geometrical Method*

The geometrical method is based on the premise that the waist curve, hip curve, and the bottom of the skirt may be drawn as parallel curves and that the center front and center back lines which define the size of the curves, if correctly drawn, are perpendicular to these curves. If this premise is accepted, it is evident that there must be some mathematical relationship between the size and the distance between these curves since they fulfill the conditions of arcs of concentric circles that subtend similar central angles. Since the size of the arc in each of the circles that is intercepted by the com-

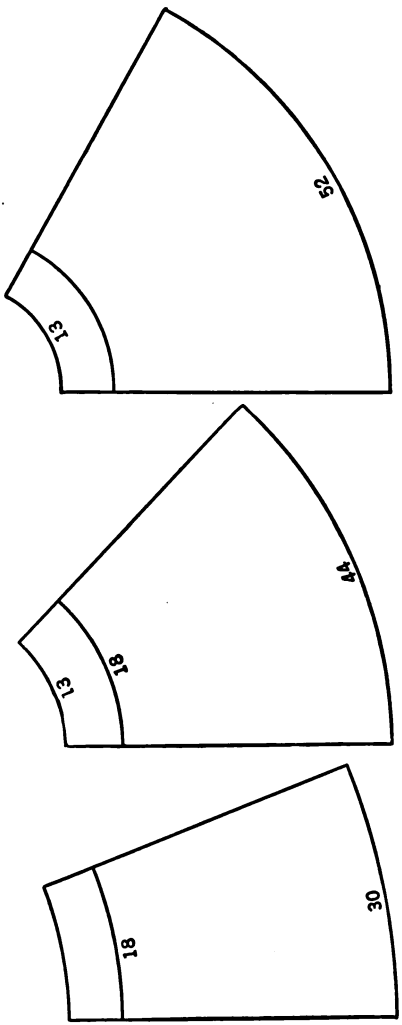


FIG. 40.—Small and large one piece skirts.

mon central angle is in proportion to the length of the radius of each circle, the arcs and the radii of these concentric circles are proportional quantities.

To draw a one piece skirt pattern by this method it is necessary to find the length of the radius for the circle on which the waist curve is measured. This is a very simple mathematical problem involving only one unknown quantity. To find the radius of the waist curve for a skirt of a given size around the bottom, it is necessary to know the length of the skirt, the distance between the waist and hip lines, and the desired size of either the waist or hip line depending upon whether a wide or narrow skirt is to be made. For example, if it is known that a 2 yard skirt is to be 36″ long, 6″ between the waist and hip lines and 36″ around the hip line, we have secured the following known quantities from which to calculate the length of X.

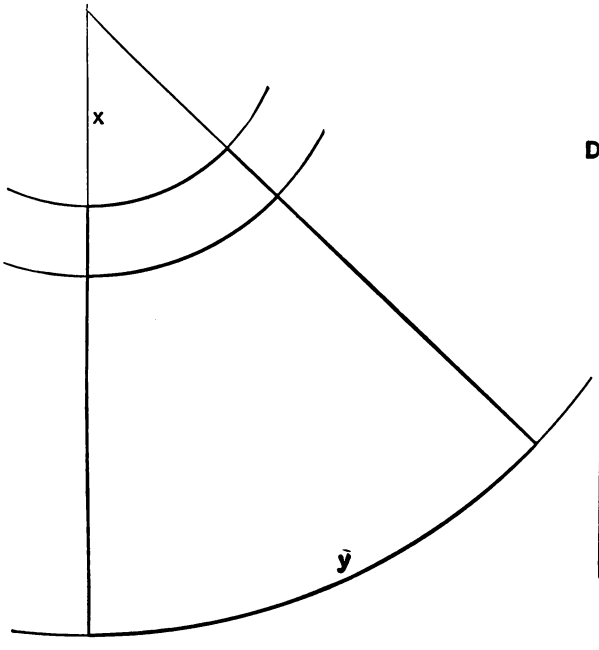
Radius of waist curve = X
" " hip " = X + 6 (distance between hip and waist line)
" " bottom " = X + 36 (length of skirt)

Hip arc = 18 (½ hip measure)
Bottom arc = 36 (½ size of skirt around the bottom).

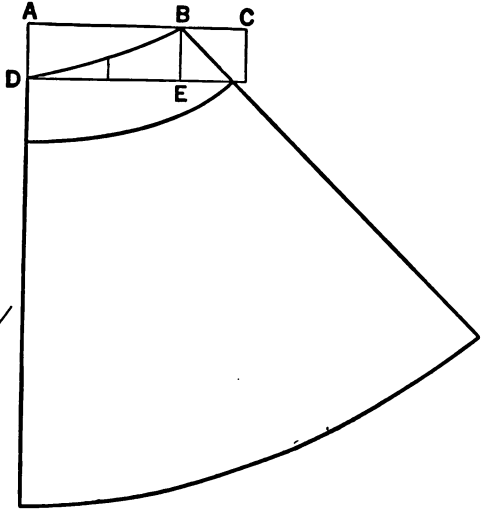
Since the arcs and radii of concentric circles are commensurable quantities the length of X can be calculated by simple proportion as follows:

Radius of the hip : Radius of the bottom :: Hip arc : Bottom arc
X + 6 : X + 36 :: 18 : 36

To make a pattern for a skirt which is wider than the normal, this same method would be used but the waist



The length of x will vary with the size of y for a given hip or waist measure.



A C = 1/2 hip measure.
B C = 1/8 of 1/2 the bottom of skirt.
A D = 1/10 of 1/2 the bottom of skirt.

FIG. 41.—Two methods of securing the waist curve.

measure and the waist radius should be substituted for the hip measure, since the waist size is the constant quantity for all skirts that are larger than the normal, and the hip size is the constant quantity for all skirts smaller than normal. When the size of the skirt around the bottom is an unknown quantity as in the normal skirt, the arcs and radii of the hip and waist must be used.

After calculating the radius of the waist curve for a skirt of a given size, the actual drawing of the pattern is extremely simple. The waist curve is drawn by a string compass, and from the common center the hip and bottom lines can be drawn as parallel curves. To locate the position of the center front and center back lines of the pattern, the correct size of one of the arcs should be measured on the curve and the straight lines drawn from the pivot point or center of the circles through these points will form the front and back lines of the pattern.

Experience in making skirt patterns of all sizes by this method for a great number of people with different types of figures has demonstrated that it is the most satisfactory and accurate method though the curve of the waist line needs some modification in fitting for some unusual figures. This same criticism can be made of all of the other methods of drawing the waist curve, however, and intelligent modification of the waist line of a one piece skirt should be taught as a fitting rather than a drafting problem. Another point to be noted about patterns of this type is that the length of the skirt is uniform for the front, back and side, and before the pattern is cut the bottom line should be corrected to give the proper length at the side and back.

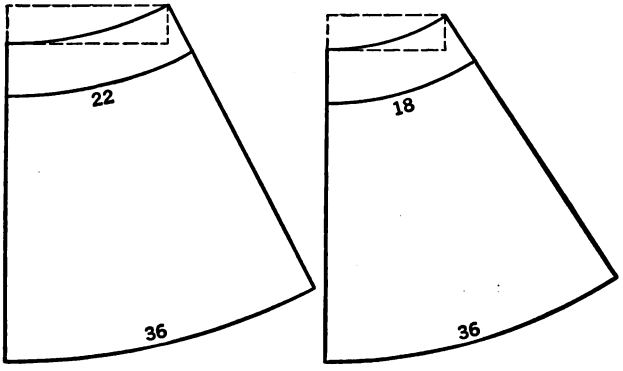
B. *The Parallelogram Method*

If a parallelogram, the shorter side of which is a continuation of the center front line and the longer side of which terminates at the back end of the waist line, is erected on each of the skirt patterns in Figure 40, it will be found that the shape of the parallelogram varies with the size of the skirt around the bottom. If a parallelogram in correct proportions to the size of the skirt can be made, it is a very simple problem to inscribe the waist curve which it defines. This principle is the basis for the second method of drawing a waist curve illustrated in Figure 41.

There are two ways of adjusting the size of the parallelogram by the size of the skirt; by a table which gives the width and length of the parallelogram for a specified skirt width, or by making the sides of the parallelogram a proportion of the skirt width. Since the use of a table of measurements is not always convenient the latter of these two methods is usually adopted by systems which base their skirt patterns on a parallelogram.

The second drawing of Fig. 41 illustrates the adaptation of this method of drafting a skirt that is used in one of the well known drafting systems. Though the parallelogram A, B, D, E, controls the intensity of the waist curve only one of the dimensions of the parallelogram, the height, is entirely influenced by the size of the skirt around the bottom, for the width of the parallelogram is conditioned by the size of the hip as well as the skirt width. The reason for this can be clearly seen in Figure 42 which shows the parallelograms required for two skirts of the same size around the bottom but made for two people with different hip measures.

The selection of 1/10 of 1/2 of the bottom of the skirt for the height of the parallelogram and 1/8 of 1/2 of the skirt for the amount to be taken from the hip width which is used in Fig. 41 is not based on mathematical accuracy but represents an approximate measure which is fairly accurate for persons with average proportions in waist and hip size and for medium width skirts, though it is somewhat less accurate for skirts that are



Influence of the size of hip measures on the shape of the parallelogram.

FIG. 42.

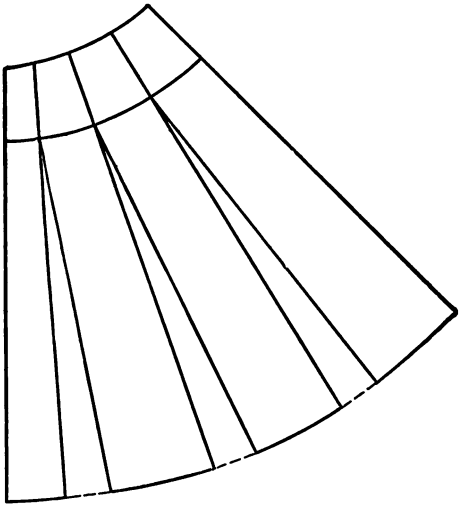
larger than the normal. The character of the curve BD is governed by a short perpendicular placed midway between D and E that equals the difference between the front and side length measures of the skirt.

This method of drafting produces quite satisfactory patterns though the waist curve usually needs some adjustment for large skirts. The chief criticism of this method is that it provides no way of making without experimentation a skirt which will be the exact size of the

waist and hips of any member of the class, such as can be made by the geometrical method of skirt drafting.

C. *Gashed Patterns*

To make patterns for skirts of different sizes by gashing a foundation pattern, and increasing or decreasing



Normal skirt made from narrow foundation skirt by gashing.

FIG. 43.

the hip, waist or bottom measures by spreading or lapping the edges of the gashes is theoretically quite a simple method. From a practical standpoint, however, the difficulty of handling a gashed pattern of this size and the fact that some method of making a foundation skirt pattern must also be taught make this a less satisfactory method of skirt drafting for school work than

the geometrical or parallelogram method. For the home dressmaker, however, who has acquired a foundation skirt pattern with the correct hip measure, the making of skirt patterns by this method is probably simpler than the drawing of a separate pattern for each size skirt that she may desire.

The foundation pattern used for gashing should be made for a skirt that is smaller than the normal around the bottom, about 1½—1¾ yards, depending upon the hip size, and that uses the actual hip measure at the hip line. This pattern should be cut or gashed on lines which would correspond to the seams of a 7 or 9 gore skirt. In spreading or lapping the edges of the gashes, the principles which govern all one piece skirt patterns must be carefully considered: for skirts larger than normal, the pieces at the waist line must be lapped until the curve is the size of the actual waist line, and at the hip they must be spread for the increased hip line; for a normal skirt, the pieces will still overlap at the waist line but at the hip line they will just meet; for skirts which are to be narrower than the foundation pattern, the pieces should be lapped at the bottom edge and spread apart at both the hip and waist line since such a skirt will be too narrow to sit down in unless more width is allowed for by increasing the hip measure.

Measures to be used in drafting skirts.—The measures to be used in skirt drafting are few in number and very simple to take. The same number of measures are required by nearly all systems, and with the exception of the hip measure, they are usually taken in the same way. The hip measure may be taken in two ways, parallel to the waist line or parallel to the floor. It is quite important that the hip measure should be

taken as it is to be used in the draft as there is an appreciable difference in the size of the hip line in these two positions. The two drawings of Figure 41 illustrate hip lines in each of these positions.

Waist measure:

The line of the waist curve to be used in skirt drafting should be carefully placed. The measure should fit closely but not tightly and it should curve down slightly in the front.

Hip measure:

The hip line should be marked with a line of pins either parallel to the floor or parallel to the waist, and it should be placed about 6 inches below the waist. The measure should be taken rather loosely around this line.

Second hip measure:

For narrow skirts, a second hip measure about 4-6 inches below and parallel to the hip line should be taken. This measure is not necessarily used in the drawing but it is valuable to test the width of the pattern at this point in a narrow skirt.

Length of skirt:

These are the measures of the length from the waist line to the floor at the center front, over each hip and at the center back. Since many people have one hip larger than the other it is desirable to take both side length measures and the longer of these should be used in making the drawing. It is most important that all of these measures should be taken to the floor and with the tape measure hanging perfectly straight, for the length of the skirt itself can be calculated from these measures.

2. Gored Skirts

The position of the seams which define the size of the gores in a gored skirt pattern is controlled by two factors, the design of the skirt and the necessity of placing these seams so that the skirt will fit well. In skirts that are smaller than the normal, the extra width at the waist, if not desired as fullness, must be taken out in darts extending from the waist line to the hip line or even below the hip line in very narrow skirts. These darts must be placed so that they will take out the fullness at the points where it is necessary and at the same time break up the space at the waist and hip lines by a pleasing space division. The number of darts that are necessary, the amount of fullness to be taken out in a dart, and its exact position and slant will vary with the relative size of the waist and hip measures, the carriage of the figure, and the points of greatest curve between the waist and hip lines. These points can be decided most easily by fitting or modeling a skirt of the desired size made of cloth. A person who has had experience in skirt making is usually able, however, to judge rather accurately the probable position and slant of the darts needed by a particular type of figure.

The slant of seam lines.—The seams of a plain gored skirt are usually a continuation of these dart lines though in some designs of skirt both darts and continuous lines from the waist to the bottom of the skirt may be used. Since the position and the slant of seams is so important an element in the design of skirts, it is very desirable that a pattern maker should study the effects that can be produced by varying the number, position and slant of the seam lines. One of the most satisfactory methods of doing this is to use tape to outline

the seams in the same way as this was done for waists in Figure 22. If the skirt length tapes are attached by a sliding loop to the waist tape it is a very simple matter to slide the tapes to any desired position on the skirt and they can be held in position by a second tape at the hip line. These lines of tape will not only give definite points from which to measure the widths of gores but they will show in a very graphic way the apparent effect upon the carriage of the person of an incorrect slant of a seam line.

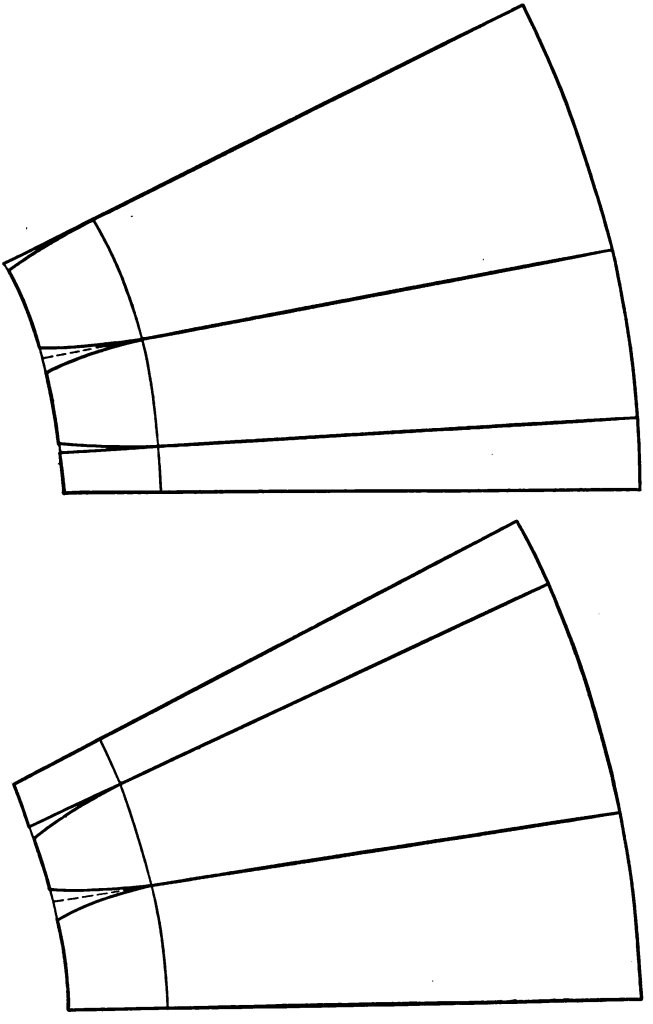
Before experimenting with the possible seam lines for a particular individual, it is most advisable to make a thorough study of the shape of gores in commercial patterns. Patterns made by a number of standard pattern makers of skirts with various gore divisions should be measured and compared. If it is possible to secure such patterns for a number of years, this problem can be combined most interestingly with a study of costume effects in vogue during the same period. The measures of a gore should be taken at the hip line and at the bottom of the skirt since it is the relative width at these two points which controls the slant of the seams.

Shape of front gore.—Skirts may be made with or without a center front or a center back seam, for example: a two piece skirt may be made with its seams at the center front and center back or it may be made with an unbroken back and front and seams over the hips; a five gore skirt may be made with a front gore and a seam down the middle of the back or with a seam down the middle of the front and a gore at the center back. Because of its relation to the whole design of the front of a costume, the shape of the front gore or panel is an important element of a gored skirt. The proportions of

the front gore have varied greatly at different times both as to its width at the hip line and as to the relative width of the hip and bottom lines of the gore. For narrow skirts, this panel is usually made with the bottom width about 1½ times as great as the width at the hip line; in full skirts it is often more than twice the hip width at the bottom with the result of emphasizing the bottom width and making the waist line seem smaller.

The number of the gores into which a skirt may be divided is only limited by the desire of the wearer and the fashion of the moment. In general terms, the number of gores that are used increases with the size of the skirt around the bottom, the reason for this being that, unless a wide skirt is divided into a number of gores the back edge of each gore will be made so on the bias of the material that in many fabrics the skirt will sag near the seam. For medium width skirts, five or seven gores is the most usual gore division.

Size of gores.—A comparison of the size of the gores in several commercial 5 to 7 gore skirt patterns will show that the size and proportions of the different gores usually vary with the different makes of patterns: some pattern makers have the first gore of a 7 gore skirt wider and the second and third gores similar in width, while in others the third gore is the widest of the three. This is due to difference in the decision as to the most effective position for the seams of the pattern at the hip line. Not only are these differences in patterns to be seen, but the relative widths of the three gores usually vary with the size of the skirt. In narrow skirts the three side gores of a 7 gore skirt are almost equal in width at the hip and bottom lines while in most full skirts the width of each gore increases as it is placed farther back. This last



5 gore skirt with panel front.

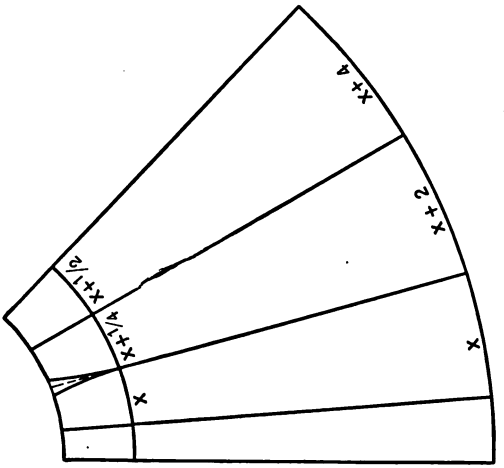
5 gore skirt with panel back.

FIG. 44.

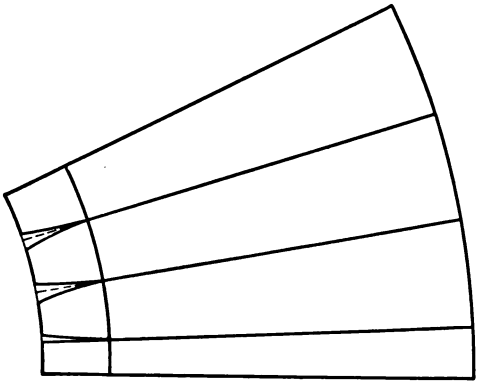
characteristic of a gored skirt is due to the fact that in a full skirt the extra width around the bottom should flare out at the back and sides rather than at the front.

Darts.—In a gored skirt that is smaller than the normal, darts must be taken off at the top of the gores in order to make the skirt the right size at the waist. The correct shape for these darts can be secured most satisfactorily by fitting though it is possible to draw them on the pattern if the type of dart needed by the particular individual is understood. By this is meant knowledge of the proportion of the extra material in the waist line which should be taken out at the front, over the hip, and at the back of the waist line. For the average figure, the deepest dart is usually over the hip, the smallest in the front and the next larger at the back. A dart line is a curved line extending from the waist to the hip and terminating in the seam line. In drawing hip and back darts the amount taken off of the back of the gore is usually greater than the amount taken off of the front of the adjacent gore.

Modifications of the plain gored skirt.—Using a plain gored skirt as a basis, it is possible to make skirts of a great variety of designs by such simple methods as the following: by introducing fullness at any point in the form of tucks, plaits or gathers; by substituting a seam at the hip line for all seam lines above the hip; by using both darts from the waist to the hip and gore lines and making each of these a decorative feature; by shaping the gores to secure an outline which varies from the straight seam lines of the plain gored skirt; by using a yoke or a circular, gathered, or plaited flounce for part of the skirt length; etc.



Wide 7 gore skirt.

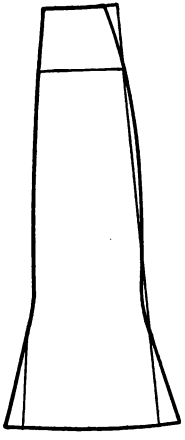


Narrow 7 gore skirt with equal size gores.

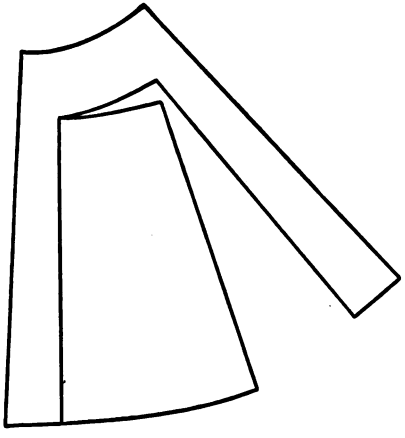
FIG. 45.

Plaited skirts.—The addition of plaits at the seam lines is one of the most used and simplest methods of making a skirt. These plaits may be used as box plaits, inverted box plaits, or side plaits, and they may extend from the waist line to the bottom of the skirt or for only a portion of the skirt length. The position of the seam in a plaited skirt should be at the inside fold of the plait; the only exception to this rule is in the case of an inverted box plait at the center back seam where the seam is almost invariably found in the middle of the box plait, and shows on the right side where the folds of the plaits come together. In order to make the seam in plaited skirts come at the inside fold, the extension for the plait must be the same width on the adjacent sides of the two gores that are to be joined in the seam, in the case of side plaits, while for box plaits or inverted box plaits, the extension must be greater on one side than on the other. The reason for this can be seen easily if a piece of paper is plaited to illustrate each of these types of plaits.

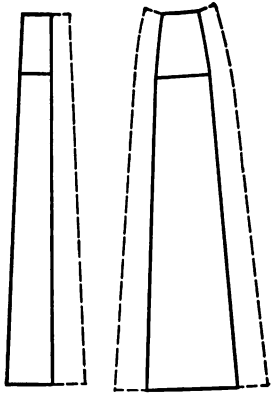
The width of the extension for a plaited skirt will vary with the style of the skirt, the number of plaits, and the desire of the wearer. A deep plait usually retains its folds better than a narrow plait. Plaited skirts based on a gored pattern are made, usually, with a deeper fold at the bottom of the skirt than at the hip line; straight plaited skirts such as are used for plaid and checked materials have plaits similar in depth at these two points or deeper folds at the hip line. The shape of the waist line of the extension will depend upon whether the fold of the plait is turned toward the front of the skirt or toward the back of the skirt. Because of this, the plait should be folded and the two gores placed so that the



Shaped gore for skirt flaring suddenly below the knee.



Front and back panels and circular yoke made in one piece. Side gore stops at hip line and is based on a narrower skirt.



Front and first gores of a plaited skirt. Extension = depth of plait + seam. Shape of extension at waist corrected after plaiting.

FIG. 46.—Modifications of plain gored skirts.

hip and waist lines join before the final shape of the extension at the waist line can be cut. It is very important, therefore, to mark clearly the position of the waist and hip lines on the material from which a plaited skirt is being made.

Use of hip line seam.—The use of a seam at the hip line in place of darts or seams above the line is often seen among the designs for narrow skirts. This may be a straight seam or an irregular line or it may incorporate pocket openings or similar decorative elements. The position of a hip seam may be a little above or a little below the hip line if the proportions of the skirt necessitate such a change. The center drawing in Figure 46 illustrates a very simple design of this type which can be made from a narrow four gore skirt having a front and back panel. The side gores are cut off at the hip line, and the close fitting yoke is obtained by folding out the darts above the hip line before the material is cut. Another and possibly a simpler method of making this pattern is to make a circular yoke pattern and use this for the upper part of the skirt.

Circular yoke and circular flounce patterns.—A circular yoke pattern for skirts is a one piece pattern which fits closely at the waist and hip lines. It corresponds to the upper part of a normal skirt pattern. The simplest method of making this pattern is to calculate from the waist, hip, and depth of the yoke measures the radius of the circle which will give the correct waist curve, and draw the pattern from this. Many of the drafting systems which do not use the geometrical method for drawing a one piece skirt attempt to make yoke patterns by using a proportion of the waist for the radius of the waist curve. The measures most often used by these

systems are 1/3 of the waist or 1/2 of the waist. If yoke patterns for various people with different waist and hip measures are made using these two measurements, the inadequacy of this method is quickly demonstrated. It will be found that in very few cases will it be possible to secure the correct measure on the waist and hip curves and, at the same time, a center back line perpendicular to the waist curve.

Patterns for circular flounces may be made by the same method as those for circular yokes, the width of the skirt at the top of the flounce, its depth, and the desired size around the bottom being the measurements used. These pattterns may also be made by gashing. A pattern of the portion of the foundation skirt which is to be covered by the flounce is gashed at regular intervals of about 3 inches at the bottom, from the bottom to about the top line. These gashes are then spread apart until the flounce is the desired width at the bottom.

Shaped gores.—Though nearly all gored skirt patterns use straight lines for the sides of the gores, it is possible to change these lines slightly if some particular effect is desired in the outline. The skirts made with gores which flare out suddenly at the bottom illustrate such a change in shape. While skirts of this kind may have a temporary vogue, much more interesting effects can be secured by the use of separate pieces or by draperies when a sharp change in the outline of a skirt is desired.

Patterns for skirts of unusual design are usually made by modeling or draping on a figure. Though it is possible to model skirt patterns directly on the figure of the person for whom the pattern is to be made, this problem can be greatly simplified by the use of a dress form

which is padded out to correspond to the size and contour of the particular figure. The making of patterns for narrow or close fitting skirts by modeling is quite simple for it is largely a question of fitting. Patterns for full skirts are more difficult to make as the arrangement of fullness is a draping rather than a fitting problem.

3. Patterns Based on Skirt Patterns

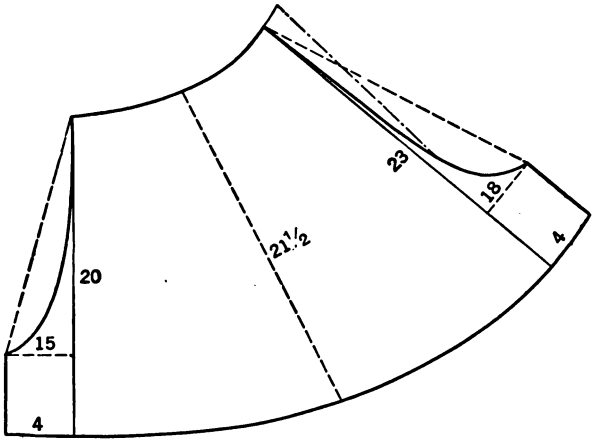
A. Underskirts.—The patterns for under clothing that are based on the skirt pattern are for underskirts and drawers. Underskirt patterns may be made close fitting on the same lines as a plain gored skirt, but in most cases, they allow for fullness at the hip and waist lines, the amount of the fullness varying with the size of the skirt around the bottom. The majority of ready made underskirts are made with four or five gores and a panel front; the four gore skirts have also a panel in the back. These patterns can be made from outside skirt patterns with a corresponding number of gores by adding extra width at the waist and hip lines and decreasing the curve at the waist in proportion. In drafting an original pattern for an underskirt, 6″ or 8″ of fullness should be added to the hip measure and the radius of the waist curve should be calculated with this increased measurement in order to secure the proper curve at the waist line.

B. Drawers.—Drawers patterns are of two types: those that are comparatively close fitting at the waist and hip lines, and the full or bloomer type. It is the close fitting patterns that are based on skirt patterns. Figure 47 illustrates two of these patterns for circular or narrower drawers. Either of these patterns can be

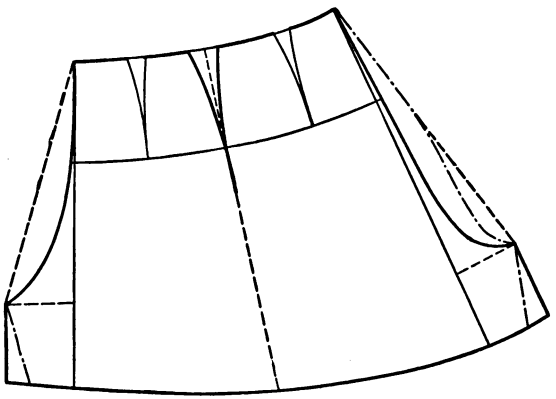
used for either open or closed drawers if the modification for each of these methods of making as shown by the dot and dash lines is incorporated into the pattern.

Close fitting patterns.—To make drawers patterns of this kind, the waist curve and the center front and center back lines should be drawn as for a skirt pattern, of a corresponding width. For the circular pattern, the size of the waist and hip lines are known, and for the narrower pattern, the hip measure and the desired size at the knee should be used. Even though these patterns are called close fitting, the waist and hip of all drawers patterns should be increased about 2″ as drawers usually are worn a little below the waist line. The measure for the length for these patterns is taken at the side over the hip to the desired length of the drawers. This measure is used on the dotted line which is placed midway between the front and back line as this corresponds to the position in which the measure was taken. The length on the center front line should be as much less than the measure over the hips as the difference between the front and side length measures for a skirt; this is usually 1″ to 1½″. The length of the center back line, which should be at least 3″ longer than the front length, illustrates one of the marked characteristics of drawers patterns which is a longer back length measure than would be used for a loose hanging garment like a skirt.

After drawing the waist and bottom curves and the center front, hip, and center back lines the shape of the extension is next to be considered. In Figure 47 the shape of the back seam and of the leg seam of the pattern varies with whether open or closed drawers are to be made. These variations are suggestive rather than es-



Circular drawers pattern based on normal skirt. Dot and dash line shows extension for placket for open drawers.



Darted pattern based on narrow skirt. Dot and dash line shows shaping of extension for closed drawers.

FIG. 47.—Drawers patterns.

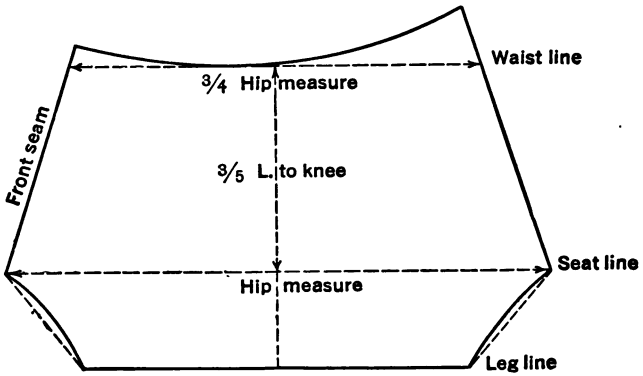
sential as an equally comfortable pattern for closed drawers can be made with the back and leg seams as in the upper drawing. In this drawing, the leg seam is parallel to the center front and back lines, and placed so that about 4″ is added at both back and front to the width of the pattern.

The length of the leg seam, which should be the same at back and front, is controlled by the amount needed for length in the front and back seams. This will depend upon the size of the person for whom the pattern is to be made. In Figure 47, the perpendicular construction line which defines the length of the leg seam is placed 15″ below the waist line in the front and 18″ below it in the back. These measures are good averages for a person who measures about 25″ from the waist to the bend of the knee over the hips, and they should be increased about 1″ for each 2 inches increase in leg length. This measure from the waist to the bend of the knee should always be used to regulate the proportions of leg and seat lengths in drawers patterns since it is an actual measure of the person, while the measure of the finished length of the drawers depends upon the fancy of the wearer.

A curved line is used for the front and back seams of these patterns. The dotted construction line which extends from the waist curve to the end of the leg line is drawn on the pattern in Figure 47 in order to show more clearly the character of the curves to be used for these two seams. These curves should be carefully studied and they should be reproduced as nearly as possible in drawing a pattern. It is quite obvious that if open drawers are to be made that some allowance for a placket must be made at the center back line. The

placket extension shown in Figure 47 allows for about a 3″ lap at the waist line. For closed drawers the placket is always cut on the lengthwise line over the hip.

Full or bloomer patterns.—Though full drawers patterns show some of the characteristics of close fitting drawers patterns, they conform so little to the lines of the figure that their shape is conventional and not controlled by exact measures and clearly defined principles of drafting. While the proportions of the pattern and the detailed directions for making may vary somewhat, most drafting systems have worked out a pattern of this type based on one lengthwise measure and one measure around the body such as the waist or hip measure. The method of drafting illustrated in Figure 48 has been selected as it makes a good and typical pattern of this type. The measures used are the hip measure taken loosely and the length from the waist to the bend of the knee, taken at the side over the hips. Two additional measures should be taken on the figure or decided



Child's gathered drawers pattern.

FIG. 48.

upon by measuring satisfactory garments of this type: they are the desired size of the leg opening and the desired length of the finished drawers.

The construction lines used in this pattern are a vertical line on which the lengthwise measurements are taken and three parallel horizontal lines, the waist, seat and leg lines. The vertical construction line is made the length desired for the pattern, and the leg and waist lines are drawn at the ends of this line and perpendicular to it. The position of the seat line should be regulated by the size of the person, so a proportion of the actual length from the waist to the knee is taken to place this line. The seat line is drawn so that the distance between the waist and seat lines is $\frac{3}{5}$ of the length from the waist to the knee.

The width of the pattern at the seat and waist lines depends upon the amount of fullness that is desired. An average width pattern can be made by using the hip measure on the seat line and $\frac{3}{4}$ of the hip measure on the waist line. This width should be measured so that the vertical construction line divides the pattern in the middle. The front seam of the pattern is drawn from the end of the seat line through the end of the waist line and extends about one inch beyond; the back seam is drawn at the opposite ends of the seat and waist lines and extends 3 or 4 inches above the waist line. The waist curve is drawn from the upper end of the front seam through the end of the vertical construction line to the upper end of the back seam.

The slant of the leg seam in this pattern is controlled by the measurement used for the leg line; while this opening can be made any desired width a more comfortable pattern is made if the opening is fairly big. A

measure only slightly smaller than that taken at the waist line is used in Figure 48. . The leg seam is a slightly curved line drawn from the end of the leg line to the end of the seat line.

EXERCISES FOR CHAPTER IV

1. Given the hip and waist measures and the size around the bottom of a normal skirt is it possible to find by calculation the amount that must be added to the waist size for a narrow skirt of a given width around the bottom?
2. Is it possible to work out a table of measurements for parallelograms which will make skirts of all sizes for any hip size? Compare the hip and waist measures of an average class and discuss the practicability of such a table.
3. Is there any limit to the possible size around the bottom of a one piece skirt larger than the normal? Explain and illustrate.
4. In order to prevent a very full one piece skirt from hanging out at the bottom in the front, how would you correct the waist curve? How would you expect to correct the waist curve of a normal skirt for a person whose figure is broad through the hips and flat?
5. From the standpoint of design is it better to increase the width of the gores or increase the number of gores for a person with a very large hip measure?
6. Make a plaited skirt in soft paper which has a plait in the center of each gore and one at each seam, from a 7 gore skirt pattern made on a ½ inch scale.
7. Which lengthwise line of a drawers pattern should be placed on a warp thread when cutting the material? Under what conditions would you place the center of the gores of a gored skirt rather than the front edge of the gore on a warp thread?
8. Explain the reason for using the difference between the front and side lengths of the skirt for the point which defines the intensity of the curve in the second drawing of Figure 41.
9. Make by the geometrical method narrow, normal and full skirt patterns for several people with different waist and hip measures; construct on these drawings waist curve parallelograms and compare the measurements of these parallelograms with the measurements used in the second drawing of Figure 41.